SOLAR COOKERS INTERNATIONAL (Eastern Africa)

Partnership for Clean Indoor Air Scale-up Projects
Environmental Protection Agency (EPA)
RFA NO: EPA-OAR-ORIA-07-03

SUMMARY INFORMATION PAGE

1. **Project Title:**

Sunny Solutions

Market Access to Clean Cooking Technology for Wealth and Health in Kenya

2. **Applicant Information:**

Applicant: Solar Cookers International (SCI) Eastern Africa – A registered charity in Kenya
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3. **Funding Requested** -- Solar Cookers International requests EPA cooperative agreement support valued at $150,000 for scale-up of a successful household energy project in Kadibo Division, Nyanza Province, Kenya.

4. **Total Project Cost** -- The total two-year project cost is $230,000. Funding from other sources include: SCI members ($80,000).

5. **Project Period** -- June1, 2008 to May 31, 2010

NARRATIVE WORK PLAN

Sunny Solutions

Market Access to Clean Cooking Energy for Wealth and Health in Kenya

1. PROJECT APPROACH

a. *CURRENT HOUSEHOLD ENERGY AND HEALTH SITUATION OF TARGET POPULATION*

While many ways are proposed to address the cooking energy needs of households in developing countries, very few make use of clean, largely untapped, renewable energy sources. An affordable, entry-level solar cooker is currently available and Solar Cookers International (SCI) Eastern Africa is pioneering its introduction into the Kenyan marketplace through its Sunny Solutions initiative.

Our project addresses several of Kenya's development challenges:

Negative Impact of Fuelwood Scarcities
Currently Kenya has less than 1.7 percent remaining forest cover[1]. What little remains is threatened by commercial logging interests and the need for cooking fuel. Data from Practical Action-Eastern Africa indicates that 89 percent of Kenya's energy consumption is in the form of biomass, with much of that used to meet basic cooking needs. One third of rural Kenyans use charcoal and ninety percent of them use wood, crop residues, dung, and other combustibles for daily cooking. When desperate, people resort to cutting of live trees – a practice that contributes to denuding land, soil erosion, and depletion of water resources and generates much smoke in the kitchen. Since smoke is heavier than air, pollutants from burning wood and charcoal constitute about 20% of greenhouse emissions[2]. Burning of dung and crop residues further depletes soils and increasing already harmful air pollution.

Maintaining Household Health
The World Health Organization states that "*indoor air pollution from solid fuel use is responsible for more than 1.6 million annual deaths and 2.7% of the global burden of disease...This makes this risk factor the second biggest environmental contributor to ill health, behind unsafe water and sanitation. Dependence on polluting solid fuels to meet basic energy needs represents one of the biggest threats to children's health. Acute lower respiratory infections, in particular pneumonia, continue to be the biggest killer of young children and cause more than 2 million annual deaths. This toll almost exclusively falls on children in developing countries.*"[3]
Scarce fuel also means unsafe drinking water is not heated to control water-borne diseases, and slow-cooking nutritious foods such as beans are dropped from family diets. In Kenya, water and smoke related diseases are among the top five major causes of mortality in children under age five years. According to PSI, current estimates show that the country has an annual incidence of between 3.5 and 4.6 severe diarrhea episodes per child.[4] Poor nutrition, smoke and unsafe drinking water are also a health threat for people with AIDS.

Limited Economic Development Opportunities for Women

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[1] The Courier, UNESCO, 2006
[2] http://www.solarcooking.org/newsletters/scrdec99.htm#financing
[3] The Health Effects of Indoor Air Pollution Exposure in Developing Countries, N. Bruce, R. Perez-Padilla, R. Albalak, WHO 2002
[4] http://www.psi.org/where_we_work/kenya.html#

According to Kenya's National Rural Energy Task Force, *"all people are dependent on energy , as energy services facilitate livelihoods...Lack of access to adequate, affordable, reliable, safe and environmentally benign energy can place severe constraints on development ... energy scarcities for basic services hinders economic and social development."*[5] In some rural areas, wood shortages combined with private land ownership means wood is no longer free and nearby but is a commercial commodity, and prices continue to rise as traders must travel farther to obtain it.

Women and girls are disproportionately affected by the lack of access to energy, especially cooking energy. The International Center for Research on Women concludes that because of time spent on tasks such as fetching water and collecting firewood, women and girls shift time away from agricultural production and other types of income-generating activities, and even cooking[6]. These tasks also limit opportunity for women and girls to improve their lives through education, civic participation, and other activities, and further compromise their ability to break free from the cycle of poverty.

Project Target Population

Kadibo Division is one of the flood prone areas in Nyanza province that also experiences severe fuelwood shortages and exposure to indoor air pollution.

Practical Action carried out research on fuelwood use and indoor air pollution in Kadibo Division, which is a few kilometers from Kisumu, the third largest city in Kenya. The people are primarily of Luo ethnicity. Baseline data on particulate matter and carbon monoxide is available for that location. Despite its proximity to Lake Victoria, the area is virtually devoid of vegetation. Women resort to using *Papyrus* reeds as cooking fuel. The reeds generate a lot of smoke and must be carefully attended to. Practical Action provided information on smoke reducing strategies including solar cookers to villages in Kadibo and nearby divisions. In 2005, Solar Cookers International met with local leaders who are eager to address the area's fuelwood crisis and in 2006 gathered preliminary information on fuelwood use, socio-economic conditions and public health in North Nyamware sub-location (pop. 5000). In 2006 – 2007, SCI in cooperation with GVEP initiated the project which to date have disseminated 277 solar cookers and a wide range of range of knowledge on energy conservation in the kitchen and related technologies.

The project proposes to increase access to clean energy services for underserved and un-served people as a strategy towards economic development and poverty alleviation. Currently we propose to expand to all the 8 locations that make up Kadibo Division. We hope to reach about 3,000 households. Market-based spread of emission free solar cookers and other related technologies will advance Kenya's progress towards meeting its Millennium Development Goals. Combined, the health, social, and economic benefits of using the clean, smoke free energy to cook food and pasteurize water will have a significant impact at the household level.

[5] Energy Sector Development Strategy, Rural Energy Task Force, Final Report, Kenya Ministry of Energy, 2003
[6] Infrastructure Shortfalls Costs Poor Women Time and Opportunity, ICRW, 2005

b. EXISTING COMMERCIAL ENTERPRISE TO BE SCALED-UP

We propose to increase awareness and market-based availability of three clean cooking energy technologies and related clean air technologies in Kadibo. The expansion of the marketing and sales network has already started, with the recruitment and subsequent training 8 sales representatives. We intend to recruit and train 12 more to have a total of 20 to achieve this coverage. Recognizing people's needs for clean cooking energy when solar cooking is not possible (rain, cloud, at night), the project will strengthen local access to retained-heat cookers and a common improved stove (the *upesi jiko*) by increasing the sales agents range of products and strengthen linkages with ITDG (Practical Action). SCI proposes to enjoin in the credit facility proposed by ITDG / PA to enable sales agents access funds and buy technologies which they would then sell for a profit and pay back. This would work as a revolving fund managed by a separate entity. It is envisaged that this is one way of instituting and enhancing sustainability measures while demystifying the local's fear of taking out loans.

Solar CooKits

An inexpensive, panel-type solar cooker called the CooKit was first introduced in refugee camps as a relief measure starting in 1995. Over the next eight years, SCI implemented what proved to be successful participatory methods for disseminating solar cookers. Seeking to broaden our efforts in a manner that would result in independent, market-based access to solar cookers, we adapted our approach to meet women's needs for energy and income generation. Thus we initiated market-based

sales of a low-cost solar cooker in 2003 in the Upper and Lower Nyakach Divisions, in Nyanza Province, Kenya.

Prior to 2005, the CooKit was factory-made in Nairobi, and sold with accessories for US $8, with most of the profit going to the manufacturer. The CooKit materials were then changed, making hand-assembly possible, thereby increasing the profit margin on each solar cooking kit sold and allowing decentralized production. A hand-assembled CooKit with cooking bags and instruction booklet retails for 450 Kenya Shillings (US $6.5). The Sunny Solutions initiative will gradually expand to serve multiple communities in effect creating popular demand for a high-impact, smoke-free, and low-cost cooking technology, setting the stage for sales nation-wide.

Nyakach soils are degraded and cooking fuel is scarce and expensive. There SCI empowered 23 local women to sell solar cookers. By the end of 2006, over four thousand CooKits had been sold and 90,000 residents (out of a population of 113,000) became aware of the benefits of clean cooking energy. In late 2005 and early 2006, Sunny Solutions expanded to two new sites in Kenya – drought-prone Kajiado and flood-prone Kadibo. Common features of the initiative across sites are direct health and economic benefits and new income generation opportunities for women. The project will provide further evidence that affordable cookers - sold above wholesale cost - can spread locally and nationally in Kenya.

Solar cookers complement other improved cooking technologies, allowing families to achieve maximum fuel savings. The proposed scale-up of the initiative at the Kadibo site will broaden the clean energy services provided to include retained-heat cookers and a common fuel-efficient stove (the *upesi jiko*) while increasing sale of affordable solar cookers and other related interventions through partnership with ITDG (Practical Action).

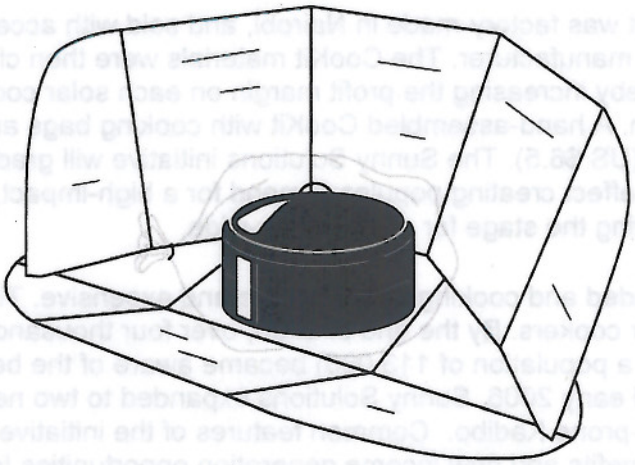
To help establish market demand for solar cookers in Kenya, Solar Cookers International currently underwrites the operational costs for the Sunny Solutions project. The economic benefits accrue to the vendors and solar cooks. The most active sellers in Nyakach have considerably improved their economic status, benefiting from commissions as well as from solar cooking at home. Their clients are also achieving economic gains from savings on fuelwood. These gains are tangible in frequent reports of purchases of food, animals, medicine and many household essentials attributed to saving due to use of the CooKit. Benefits not yet quantified include improved health status from reduced exposure to smoke, waterborne pathogens, and increased nutrition. This strategy will be modified to fit in with the revolving fund, and to enable the retention of some of the profits, which will them be injected back into the fund to enhance its sustainability.

Prior to the training of sales representative in early December 2006 in Kadibo, the project supervisors and their assistants worked with women's groups and other members of the community to promote the CooKit. As expected, sales were occasional during the initial introduction of this previously unknown cooking technology. Members of women's groups tried the CooKit on a rotational-basis and the most enthusiastic cooks were invited to train as solar cookers sales representatives (SCOREPS).

SCI Investment to Date

During calendar year 2006, Solar Cookers International invested $80,815 in the expansion Sunny Solutions to Kajiado and Kadibo. From July 2002 to June of 2006, $158,278 was invested in market-based access to CooKits in Nyakach. This investment resulted in the sale of more than four thousand CooKits and awareness of solar cooking by over 90,000 people.

Figure 1: The CooKit



***Upesi* Stoves and Retained Heat Cookers**

The *upesi* wood-burning cookstove was developed in the early 1980s by the Kenya Ministry of Agriculture with assistance from Practical Action (formerly the Intermediate Technology Development Group) and GTZ (The German Agency for Technical Cooperation). Around the same time, an improved charcoal burning stove – the Kenya Ceramic Jiko was introduced. Both remain popular today thanks to the efforts of the Kenya Energy and Environment Organization (KENGO), Maendeleo ya Wanawake, and others. In 1986, Practical Action and KENGO trained a group of women potters in western Kenya to produce the *upesi jiko* as an income generating activity. Extensive marketing was done by Ministry of Agriculture officers until funding ended and the project entered a new phase aimed at improving the commercial viability of upesi stove production and sale. These efforts have succeeded in an average adoption rate of 15 percent with as average sales price of 200 Kenya Shillings (US $2.90). As with solar cookers, commercialization is a long and expensive process.

The Kenya Ministry of Agriculture also carried out promotion of the retained heat cooker. Similar to the *upesi* stove, promotion efforts by Ministry extension agents are now considerably slower than in the past and depend largely on the good will of individual agents. Development organizations such as KENGO and Practical Action have/are engaged in promotion with limited results. Individual producers sell their retained heat cookers to those interested and several supermarkets make occasional sales. By and large, distribution networks are weak and consequently uptake of the retained heat cooker by Kenyan households is still very limited. Retail prices are high – in the range of 700 to 1500 Kenya Shillings (US $10-22) depending on materials used, design and size. Women who sew and weave baskets can make their own retained heat cooker. Since 1998, SCI has frequently demonstrated the retained heat cooker during solar cooker demonstrations and has taught its sales representatives how to make and use them.

SCI Investment to Date

Financial investment by SCI in the promotion of the *upesi* stove and retained heat cookers has been minor as our primary emphasis has been on CooKit. Information was gladly shared when questions arose on how to cook at night and when it is cloudy. SCI now recognizes that it can play a key role in encouraging *upesi* stove and retained heat cooker use in our target communities by linking project participants to the appropriate suppliers. SCI proposes the *upesi* stove since this is what in popular in the market and has been tested by our partner (ITDG) and will be further tested by Approvecho as required. The *upesi* stove can be used in two ways, in a fixed cooking spot e.g. a Kitchen or as a

portable stove that the cook moves about with to her convenience. SCI plans to continue sharing information on the need for kitchen ventilation, smoke hoods, use of a lid and food preparation in advance of cooking.

2. PROJECT GOALS, OUTPUTS AND OUTCOMES

a. *PROJECT GOALS:*

The project builds on the year 2006 - 2007 awareness creation efforts that laid the groundwork for a solar cooker social marketing campaign in Kadibo. The project goals are to:

- Expand the marketing and sales network for solar cookers, *upesi* stoves and the retained heat cookers.
- Strengthen local access to smoke reducing cooking technologies that complement solar cookers
- Reach at least 3000 households by the end of the project.

The proposed milestones and timeline to achieve these are outlined in Table 1:

Table 1: Project Milestones and Responsible Parties

Detailed Description of Activities and Time - lines										
			June to Aug 2008	Sept to Nov 2008	Dec to Feb 2009	March to May 2009	June to August 2009	Sept to Nov 2009	Dec to Feb 2010	March to May 2010
Goal	Activity	Responsibility								
Expand the marketing and sales network for solar cookers	• Establish and collate data from ITDG data on IAP status in the area.	Joint								
	• Develop educational materials for use in public education • Use of media for wider awareness • Community mobilization	Joint								
	• Create awareness in other institutions and agencies - talks	Joint								
	• Capacity building training of	Joint								

	current sales reps										
	• Public education and awareness on the smoke status and available interventions to mitigate it.	Joint									
	• Demonstrations of the interventions	Joint									
	• Group dynamics and cohesion for revolving fund	Joint									
Strengthen local access to other smoke reducing cooking technologies	• Approvecho testing of interventions	Joint									
	• Training on and the up – scaled production of tested interventions	Joint									
	• Sale of interventions / services i.e. CooKit sets, *upesi,* fireless cookers, smoke hoods, linkages with MF for credit.	Joint									
	• Selection and training of additional 12 sales reps to serve all locations	SCI									
	• Skills training for sales reps on other interventions to complement ITDG work	Joint									
	• Mid term review of progress	Joint									
	• Promotional demonstrations to sustain interest and capture new clients / customers	Joint									
	• Establishment of 8 fixed sales points to act as warehouses	SCI									
	• Progress monitoring and reporting	Joint									
	• End term assessment	Joint									

b. *Proposed Project Outputs*

The project outputs primarily seek to support the establishment of a sustainable market for clean cooking energy technologies including solar cookers and enhance access to other complementary technologies. A draft business strategy for scale-up of commercialization of solar cookers in Kenya was developed in late 2006. The proposed project will be a practical demonstration of the strategy at the Kadibo site and contribute to refining it. Our approach to creation of a sustainable market for solar cookers and other cooking technologies is three-pronged. It includes:

Establishment of a Sales Network and Client Services

The sales network will be composed of mobile retailers (SCOREPS), 8 from the current project and 12 new ones from the 8 new locations to make a total of 20. We expect to retain at least 12 by the end of the project as we know from experience that not all SCOREPS remain motivated. These retailers are women who were selected based on their prior use of and enthusiasm for solar cookers. Similarly to the sales representatives in Nyakach, the retailers will promote and sell the CooKit and the other proposed cooking technologies to women's groups, churches, school teachers and students, local organizations, and their neighbors and relatives. Solar cooker sales representatives will develop marketing, sales, and enterprise management skills that can be applied to household energy and other products.

Client services will include post-sale home visits to encourage new solar cooks and ensure proper use of the CooKit, pot and lid repainting, plastic bag sales, CooKit repairs and answering questions. Each new user receives two home visits. Sales representatives will keep a small stock of fully assembled CooKits, two upesi stoves and two fireless cookers in their homes for mobile sales and product demonstrations. Larger stocks will be stored by the project supervisors at each site in the fixed sales points. Client services seek to create a satisfied clientele, confident in using a new cooking technologies and able to experience its benefit first-hand, while urging them to acquire other clean energy products like smoke – hoods and ventilations in their kitchens.

Picture 1: A newly trained Kajiado SCOREP

As the practice of increased technology options for cooks takes root in the communities, consideration will be given to contracting with an existing local business at each site to stock the CooKit, cooking bags, pots and lids, *upesi* stoves, hay baskets and related supplies. The shop operators will also sell the CooKit, though the team mobile sellers will achieve greater sales as they can establish a personal relationship with their clients. The establishment of fixed retail points will underpin the implementation of a business proposal for expanded commercialization of the CooKit, other solar cookers and related technologies on a national-basis.

Market stimulation and technology promotion through Public, School and Small-Group Demonstrations (In the new areas)

Comprehensive demonstrations will cover a) the use of the CooKit for cooking food and pasteurizing water; b) fuel-saving technologies *upesi* and fireless cookers (including other types of solar cookers) and techniques; c) smokehoods, kitchen ventilation and other kitchen management techniques will also be given at every demonstration. It is envisaged that these will be joint exercises between SCI and PA (EA)

The content of specialized demonstrations depends on the requester and intended audience. Demonstrations may cover a) side by side comparisons of the CooKit and traditional three-stone fire; b) CooKit construction; c) retained heat cooker construction; d) use and costs of other types solar cookers; e) installing a *upesi* stove in your kitchen; f) improving kitchen lighting and ventilation; and g) application of the CooKit in the care of people living with AIDS, tuberculosis, or Pneumonia.

School presentations and demonstrations are particularly significant as teachers are considered opinion leaders of the community and their endorsement and adoption of solar cookers will have a positive effect on potential buyers. School students influence their parents to consider purchasing a new innovation. Students can also see the benefits to themselves. These benefits include not being late for school due to having to help collect fuelwood, returning home to a hot lunch at noon, being able to cook on their own without risk of burns, and having more time to do schoolwork or play.

Outreach to Local Institutions and Organizations

The project is designed to be responsive to the needs and preferences of the community. Therefore we seek out and maintain relationships with local government and representatives of the national government, development agencies, and community-based organizations. We stay informed of local events, offer to participate with a presentation and/or demonstration, and receive invitations for the latter. In Nyakach, this sustained effort led to the purchase of 1000 CooKits with pots and lids to World Vision who subsequently distributed them to very vulnerable families in Lower Nyakach. All twenty-three Nyakach representatives benefited economically from CooKit assembly and from the sales commissions.

Outreach to existing local or area vendors is needed to assure supply of *upesi* stoves and retained-heat cookers (or supplies for making them). SCI seeks to work with existing suppliers of these fuel-saving technologies so as increase local demand and avoid disrupting market structures. We used a similar approach in Nyakach where our ties with an area stove supplier and the local Ministry of Agriculture agent facilitated access to over 100 *upesi* stoves and a practical workshop on making and using a retained-heat cooker. As much as possible, SCI will work with PA (EA) to enhance access of all the technologies proposed.

Table 2: Project outputs

OUTPUT in KADIBO DIVISION	Numbers	Proposed frequency
Sales and Client services		
# of retained SCOREPS	8	N/A
# of new SCOREPS	12	N/A
# of continuous development Workshops for SCOREPS	4	2 per year
# of CooKit sales	2000	Slower initially but picking up
# of requests for other solar cookers	20	As above
# of requests for *upesi jiko*	570	As above
# of requests for training on assembly of retained heat cookers or House Holds (HH) with retained heat cookers.	410	As above
# of home visits	6000	2 per client
Promotional exercises to stimulate and sustain interest		
# of public demonstrations	24	2 per month
# of small group demonstrations	120	Dependent on number of groups
# of school presentations	48	Dependent on number of schools
Demonstrations in neighboring areas and specialized demonstrations	20	As requested
# of radio spots	24	
# of posters and other public education messages	Dependent	Distributed at public demonstrations, workshops institutions etc
Training on health messages	1	Once
Outreach to Local Institutions and Organizations		
Meeting or workshop attendance	6	6
Meetings initiated by SCI	10	10
Presentations	20	20
Liaison for access to *upesi* stoves and retained heat cookers	6	Dependent
Joint meetings with ITDG to plan joint activities, monitor progress and report back to USEPA	8	8

c. *Expected Outcomes*

Fuelwood Savings

- Savings in the range of $1-3 on weekly fuelwood expense reported by 30% solar cooking households
- Additional savings with use of one or both of the complementary cooking technologies
- Averted release of an estimated 1,800 kg of carbon dioxide per year for households solar cooking three times a week

Economic opportunities for women

- Sale of 2,000 CooKits by a team of trained, experienced solar cooks
- Profits of $1.25 or more per sale of solar cooking kits (a CooKit, four plastic cooking bags and an instruction booklet)
- Total sale of 2,000 CooKits, 20 other solar cookers, 570 upesi stoves, 410 fireless cookers bringing grand total to 3,000 interventions. Profits from these sales.
- Purchase of *upesi* stove liners and materials to make retained heat cookers
- Stimulation and expansion of the women's own individual businesses from savings and incomes gained.

Other results

- Enhanced environmental knowledge and awareness in the general community leading to behaviour change.
- Attendance at demonstrations resulting in first-hand awareness of the uses and benefits of the CooKit by a total of 20000 people
- Availability of low-cost solar cookers, *upesi* stoves, and retained heat cookers in Kadibo area
- 5% of targeted household have 5 of the interventions, 10% have at least 4, 15% have at least 3, while another 40% have at least two of the interventions promoted.

Improved health

- Client feedback of reduced frequency of diarrhea, coughing and eye irritation, and of increased ease of providing a hot lunch at home to school-aged children
- Use of clean cooking technologies in the care of people with AIDS, the elderly, orphans, the disabled or other disadvantaged groups (These outcome is of particularly of interest to SCI and will fund it separately to measure actual impacts)

As uptake increases over the two-year grant period, we anticipate reported benefits of unattended cooking such as improved school attendance for girls and more time and monetary investment in other income generating activities such as farming, handcrafts, caring for tree nurseries and fishing by women. All results will be compared to baseline data collected prior to the start of project activities and to baseline indoor air pollution measurements.

d. Technology and Fuel Performance

Technology Description

Panel solar cookers are the first solar cookers that are truly affordable to the world's neediest. In 1994, a volunteer group of engineers and solar cooks associated with Solar Cookers International developed and produced the first "panel" cooker, the CooKit. Elegant with a deceptively simple appearance, it is an affordable, effective and convenient solar cooker. It requires a dark, covered pot and one plastic bag per day or one high-temperature plastic bag per month. With a few hours of sunshine, the CooKit cooks tasty meals for 5-6 people at gentle temperatures, cooking food and preserving nutrients without burning or drying out. There is no need to stir the food once it is placed in the CooKit, freeing up the cook to do other tasks. Larger families use two or more cookers. The CooKit weighs half a kilogram and folds to the size of a big book for easy transport. CooKits are now produced independently in 25 countries from a wide variety of materials at a (wholesale) cost of $3-6 US. The new hand-assembled CooKit outlasts by six months the manufactured CooKit usable life of two years.

CooKits complement other cooking methods needed at night and on cloudy days. Coming about twenty years after the first efforts to replace open fires with improved cooking stoves, the CooKit uses no fuel at all. The CooKit is both user-friendly and environmentally friendly. It can prepare any dishes that would normally be boiled, baked, or roasted. Most staple foods in Kenya can be prepared in the CooKit. Families can save scarce, expensive for when they cannot solar cook and when economically capable, add other, higher cost cooking improvements such modern biomass, smoke hoods, biogas, or liquefied petroleum gas.

Picture 2: A variety of solar cooked food

The CooKit meets each of the threshold criteria outlined in the RFA NO: EPA-OAR-QRIA-07-03. With no fire and smoke present during cooking, the CooKit indeed reduces people's exposure to particulate matter and carbon monoxide by 100% over current local practices. Average worldwide fuel reduction from use of a solar cooker is one third or more[7], matching or exceeding the criteria of 30% reduction. The CooKit has proven acceptable in most cultures, including the Luo and Maasai ethnic groups, where most food is boiled, roasted, or baked. Although the CooKit is not considered affordable by the very poor, it is priced such that most Kenyans can access it. The CooKit provides multiple benefits. Health benefits include reduced exposure to dangerous smoke, safe drinking water with solar water pasteurization, and better nutrition through more money and time for nutritious food. Local women have the opportunity to earn additional income which provides a measure of self-reliance and independence. The business model used in CooKit dissemination in Kenya is cash positive for the retailers with a 20% profit margin. SCI will able to recoup the costs incurred in purchasing CooKit assembly supplies by retaining 10% of the profit. (Previously they would keep the whole 30%).SCI hopes that the increased range of products will give additional incomes to the SCOREPs even as SCI will works with suppliers of other types of solar cookers (HotPot, box / oven, parabolic, institutional) to meet requests by high income earners.

The *Upesi* Stove

Prior to using an *upesi* stove, women must puchase the actual ceramic liner upon which the cooking pot rests and construct an earthen cooking platform with appropriate sized openings for the wood and pot(s). Some women have avoided the stove due to lack of readily available training on platform construction. Nonetheless, field trials of the *upesi* stove showed it could provide fuelwood savings of 43% compared to a three-stone fire with up to 60% less smoke[8]. Depending on frequency of use, the

[7] Various articles by Beverly L. Blum, retired executive director, Solar Cookers International; http://www.solarcooking.org/lasting-impacts.htm

[8] Upesi Rural Stoves Project by Beatrice Khamati Njenga in Generating Opportunities: Case Studies on Energy and Women, UNDP Energy and Environment, 2001.

ceramic liner upon which the pot rests last 5-6 years. Working with PA / ITDG will fully enhance any lack of capacity and assist in expanding the base of skilled installers.

The Retained Heat Cooker

This clean cooking technology has various names (hay-box, fireless cooker, peace maker) that essentially refer to the same concept – an insulated container designed to keep food warm after initial cooking. After a short simmering time, smaller quantities cook for an hour or two; larger quantities continue to cook for three to five hours. The heat retention time is often long enough to finish a pot of meat, potatoes, rice or other foods. If necessary, food can be reheated briefly to bring it back to a second boil and returned to the retained heat cooker. For example, beans may need to be reheated after three hours and returned to the cooker for another hour or so. A retained heat cooker can be used to keep food hot and/or cooking when sunlight ceases during solar cooking—such as late in the day or when clouds roll in. Regardless of how the food was cooked, a retained heat cooker will keep food warm while one awaits or greets guests[9]. Fuelwood savings vary in the range of 40-50 %.

Use of all three fuel-saving technologies is becoming popular among solar cooker promoters world-wide as evidenced during the 2006 International Solar Cookers Conference in Granada, Spain. Design changes are anticipated for the CooKit, *upesi* stove, and retained heat cooker as recommended by Approvecho before the increase in production during the course of the project. (It may also turn out that no changes are made should the technologies meet the required standards) Variations in basketry and insulation materials for the retained heat cooker are to be expected and should have minimal impact on performance.

e. Customer Analysis and Marketing Strategy

Kenyan cooks have a high awareness that smoky fires cause symptoms such as eye irritation and coughing. Most Kenyans remain unaware of the long-term health effects of kitchen smoke since cooking on fire is an age-old practice and smoke is considered part of the meal preparation process. The proposed project provides local access to smoke reducing cooking technologies while also raising awareness of the dangers of smoke exposure. From prior projects, SCI has observed that it is often only once a woman starts using the CooKit that she realizes that her symptoms resulting from indoor air pollution have abated.

The main solar cooker to be sold in Kadibo is the hand-assembled '**OYWA**' CooKit whose retail price is 450 Kenya Shillings (US $6.5). Orders can be taken for factory made CooKits but this reduces the profit margin for the sellers, box cookers, and parabolic cookers. The sales price a 70 shilling profit made by the sales representative on each CooKit sold. Paying for CooKits in installments was popular in poverty-stricken Nyakach but this practice meant it could be months before clients enjoyed the cost-savings resulting from CooKit use. In Nyakach, consumer perceptions of the '**OYWA**' CooKit indicate that it is a) very presentable and strong, b) is practical and affordable, c) compact and portable, and d) closely resembles the factory-made CooKit. Consumers often express a strong preference for one of the binding colors. There are three colors available: red, blue and green.

In addition to the commission from the sale of a CooKit, representatives make additional sales commissions as follows:

- 40 Shillings for a painted pot and lid
- 60 shillings from assembling one CooKit

[9] Cooking Fuel Conservation – A Guide to Stovetop Food Heating Efficiency, The Kerr-Cole Sustainable Living Center, 2006.

The sales proposition for CooKits, *upesi* stoves and retained heat cookers includes the elements above. Depending on local needs and interests, one or more area may be given special attention during product demonstration and sales. There will be a significant change in way of doing business as the Representatives will be expected to take out loans from the revolving fund so as to purchase the products they want to sell. They will therefore on their won calculate an agreed upon mark – up to the sale price to afford them a profit.

Addressing fuelwood scarcities:

- Solar cooking one meal a day, three times a week has been proven to reduce fuelwood consumption and related smoke by one third.
- The CooKit saves more than four times its value in fuelwood each year. With careful use and storage, a CooKit can be used for two years, reducing fuelwood consumption by two tonnes.
- Maximum fuelwood savings and smoke reduction can be achieved with the combined use of CooKit, a *upesi jiko*, and a retained heat cooker.

Improving health

- The CooKit can pasteurize household drinking water, making it safe to drink.
- Fuel-free and fuel-saving cooking tools reduce exposure to smoke-related coughing and eye irritation.
- Solar cooked and retained heat cooked foods retain vitamins, nutrients and their natural flavors; there is no smoky taste; and the foods cook slowly bringing out maximum flavor. Nutritious, slow-cooking traditional foods (beans, root crops, and some grains) can be cooked with no fuel at all. Clean up is easy as the food never burns or sticks to the cooking pot.
- Users of clean cooking technology have money for essentials, such as extra food, clothing, school supplies, and medical care.
- With less wood or dung to gather, less smoke to breathe, and sometimes no fire to tend, clean energy cooking is easy and safe for people with AIDS and other illnesses, the elderly, disabled and young orphans.

Enhancing household and women's economic status

- Cooking with clean energy tools generates and frees up money, helping women become more self-reliant and better able to meet the needs of their family.
- Clean energy cooking saves time as there is less need to tend a fire or collect firewood. A person can solar cook while at work, at the market, or tending crops.
- Young girls can attend school and do homework instead of searching for fuelwood.
- Solar energy is free and abundant, providing a safe, clean, healthy, natural supplement to traditional fuels.
- A smoke-free kitchen and smoke-free clothing enhances your social status and appearance.

Marketing tools are based on multi-media marketing strategies will contribute to the adoption of the smokeless solar cooker, the *upesi* stove and the retained heat cooker. Strategy components are radio messages in local language (two broadcasts have already received a tremendous positive response); SCI flyers providing information on cost, potential savings and benefits from use of the CooKit; and Practical Action public awareness posters (one explaining the hazards of smoke exposure and the other featuring the three cooking technology and a well-ventilated kitchen.

SCI recognizes that it is hard for those making less than a dollar a day to pay cash for CooKits and other technologies. We accept installment (lay-away) payments. Cash sales are encouraged at all sites, though particularly in urban areas and outside of our immediate target communities. Occasional promotions such as reduced prices at Christmas are employed to encourage sales. We also

encourage women who belong to women's savings groups to use their savings to purchase CooKits in rotation for each member of their group.

f. Demand Forecasting and Supply Analysis

Demand Forecasting

Solar Cookers International estimates that 1 million solar cookers are needed in Kenya today and sales of 150,000 solar cookers would sustain on-going commercialization in Kenya. The CooKit is an entry-level product and its entry in the market will pave the way for promoters of other solar cookers to target Kenyans in the higher income brackets. The authors of the business proposal for commercialization of the CooKit indicate potential sale of 8000 units is possible over the next three years with additional sales of other solar cookers, including institutional cookers to meet demand in higher income/higher resource market segments. Based on the experience of fuel-efficient stoves distributors in Kenya, SCI estimates that a critical mass of 15% of households in sun-rich, fuel-scarce areas is sufficient to establish on-going market-based spread of solar cookers. In Nyakach, we have already reached the 15% mark.

Prior approaches to dissemination of solar cookers in Kenyan communities were primarily humanitarian, where solar cookers were heavily subsidized or provided at no cost. Local access to solar cookers ended when organizers left the area or ran out of funds. With support from their respective governments, businesses in China and India have succeeded in making solar cookers and selling them for a reasonable profit. SCI is pioneering this social marketing approach in Kenya. There are two barriers limiting the spread of solar cookers in Kenya. First, market demand is very limited, as most people do not know about solar cookers and their economic and health benefits. Second, the distribution and sales system is just emerging so as to create and meet this demand. SCI is addressing both barriers by combining solar cookers with existing, better known clean cooking technologies (in particular the *upesi* stove) and by creating pockets of high awareness and use in different areas of the country.

"Fuelwood consumption in Africa has doubled since 1950 with the demand for fuelwood in Kenya outstripping the supply by at least 4 % per year. In Kenya, woodfuel accounts for about 70 - 75 % of the total energy used which includes both fuelwood for cooking and heating in the rural areas and charcoal for the urban areas. In many rural areas of Kenya, about 90% or more of the energy for household use as well as for most cottage industry... as well as schools or clinics depends on wood fuel'.[10] The above statement indicates a near limitless demand for alternative, low-cost cooking tools and energy sources that must however be coupled with behavior change in cooking habits and attitudes towards fuelwood.

Supply Analysis

There are currently no limitations on supplies for assembling solar cookers. SCI purchases pre-cut cardboard with reflector applied from Pressmasters and pre-cut cardboard from Dodhia Industries in Nairobi. Both companies apply plastic laminate to non-reflective side of the CooKit to enhance durability. TetraPak Kenya Ltd. provides misprinted rolls of container material as part of its social responsibility program. CooKit assemblers used this waste for Oywa CooKits. Comet Industries is our supplier of inexpensive thermo-resistant plastic bags for use while solar cooking (retail price of 5

[10] Indigenous Gendered Spaces: An Examination of Kenya, D.J. Chandler and N. Wane, Journal of Culture and African Women's studies, 2002.

Kenya Shillings). The instruction booklets that accompany the CooKit are printed in Nairobi and the carrying bags for pot, lid, CooKit and accessories are made by local tailors (60 Kenya Shillings).

The project proposes to encourage SCOREPS to make their own, teach others, or ask a local entrepreneur to make retained heat cookers. *Upesi* stove liners are already in the commercial market with producers all over Western Province, Kenya.

The Kenyan government is considering restrictions on the use of plastics in Kenya as they have become a nationwide waste hazard. Although thermo-resistant bags eventually photo-degrade, restrictions on plastics presents a risk to the project. A recent visit to Kampala revealed the use of another type of plastic that is cheaper and this may encourage usage if adopted. (SCI fraternity continues to research into other products to replace the plastic bags used with the CooKit)

g. Quality Control

With respect to the Oywa and original CooKits, so far no materials other than cardboard have proven to match the combination of price and durability. For the Oywa CooKit, the TetraPak is cut to shape and glued, reflective side up, to pre-cut cardboard. The edges are then sealed with colorful book binding. When the Oywa CooKit was first introduced, quality varied with uneven application of the TetraPak to the cardboard and uneven cutting of the book binding. Product inspection in Nyakach was done by the Project Officer and Project Assistant. With close to two-years of experience, assemblers produce a better finished product in less time. Additional assembly is done in Nairobi by a contractor. There are now two sources of fully assembled Oywa CooKits – Nyakach (less an hour's drive from Kisumu, the third largest city in Kenya and Kadibo, a Kisumu suburb) and Nairobi.

Quality control for the *upesi* stove is left to the suppliers. While some potters making *upesi* liners have years of experience, others have entered the market more recently and may not have received adequate training or oversight. Retained heat cookers vary tremendously depending on who makes them and the materials used and so far, no quality control measures have been taken. The project proposes to have the technologies tested by Approvecho in the first six months of the project and adjust as need be.

h. Promotion and Marketing

Nearly all solar cooker vendors and collaborators expect immediate, frequent use based on the enthusiasm at demonstrations of solar cookers in a new area. As with all new innovations, uptake follows a predictable pattern among people everywhere: the first year or so the 2% who are mavericks try it immediately. It takes another two to three years for the 15% who are trendsetters to try it. Only if/when they find the innovation useful do the rest of us consider trying it. In each household, early use is usually occasional and intermittent, later becoming frequent and regular. Thus, in the early stages a solar cooker project is often perceived as failing when it is right on track. Part of our training includes preparing vendors and collaborators – first for slow acceptance, then for gradual increasing use. SCI will provide basic marketing materials and supplies such as distinctive aprons, shirts and bags (for visibility, credibility, and 'brand association'). Direct marketing will be reinforced by SCI-sponsored public service announcements on radio and special events.

SCI has already established contact with staff from the Ministries of Forestry and Agriculture in Rabuor in Kadibo Division as well as local officials (chiefs, District Officer). Several development organizations work in the area or nearby including Vi-Agroforestry, CARE and Action Aid.

INDOOR AIR POLLUTION MONITORING

SCI plans to contract with Practical Action for indoor air pollution monitoring and results analysis. SCI has collaborated previously with Practical Action and relied on their advice in selecting Kadibo Division as one of the sites to expand to in 2006. SCI may alternatively call on Practical Action to train our Kadibo supervisor in installing, collecting and interpreting data from measuring devices and advise on the lease or purchase equipment from the appropriate source. The protocol will be the same one Practical Action used in the past. SCI plans to measure in – door air quality using EPA funds but when it comes to personal health monitoring other funding will be used)

3. ENVIRONMENTAL RESULTS

a. *PLAN FOR TRACKING AND MEASURING RESULTS*

On-site supervisors will work closely with staff in Kadibo and Nairobi to monitor ongoing project performance and collect data to track progress toward outcomes. In all our projects, SCI values participatory learning and sharing, where the views of on-site staff, beneficiaries and collaborating partners are welcomed and appropriately followed-up. This feedback assists in continuous improvement of project activities and processes. Regular reports will contain quantitative and qualitative data such as the number of cookers sold each month and participant generated innovations in selling or using solar cookers. Special reports, case studies, media articles featuring the project, and pictures are provided to SCI management as available. SCI's Board of Directors reviews quarterly reports.

The actual results for the outputs outlined in Table 2 will be compiled quarterly and annually based on monthly reports. Monthly reports will provide more anecdotal evidence such as the reactions of the public and clients to clean cooking technology demonstrations.

b. *EXPLANATION OF PROJECT INDICATORS AND EVALUATION TIMELINE*

The indicators of project progress and evaluation timeline are outlined in Table 3.

Table 3: Project Indicators, Verification Method and Evaluation Timeline

Indicator	Verification Method	Evaluation Timeline
Fuelwood savings		
Participant reports of amount of fuelwood or money saved per week	Baseline and end of project weekly fuelwood measurements	August 2008 and May 2010
Participant reports of frequency of use of CooKit and CooKit with *upesi jiko* and/or retained heat cooker etc	Participant reporting	May 2010
Estimated CO_2 emission sequestered	Calculations using end of project fuelwood measurements and frequency of CooKit and other technology use.	June 2009
Benefits of increased technology options		
Participant reports ease of use of a variety of technologies	Discussions, focus groups feedback	May 2009
Participant reports on the benefits of various technologies	Case studies	May 2009; on-going
Economic opportunities for women		
Skilled sales team, number of retained representatives.	Case studies, feedback, focus groups	on-going; May 2010
No. CooKit / Upesi / fireless cooker sales and installations.	Monthly reports; remittances to SCI	on-going
Profit by SCOREPs and reports on how they used the additional income	Monthly reports; anecdotes/case studies/focus groups; end of project assessment	on-going; May 2010
Women using solar cookers in food retail	Quarterly reports; end of project assessment	on-going; May 2010
Purchase of *upesi jiko* and retained heat cookers	Quarterly reports; end of project assessment	on-going; May 2010
Other benefits		
Participants at demonstrations and awareness of clean cooking technologies	Monthly reports; end of project assessment	on-going; May 2010
Local availability of clean cooking technologies	End of project assessment	May 2010
Improved health		
Participants report of improved Health through reduced incidents of coughs, eye irritation etc	End of project assessment	May 2010

Baseline information was gathered for both sites to assist in testing assumptions and refining project plans. The information documented included a) the types, sources, uses and costs of fuel; b) development needs identified by community members (in focus groups); c) the types of foods cooked and cooking technologies used in food preparation; and d) basic demographic and climatic data.

In 2010, SCI will carry out a comprehensive evaluation to assess progress towards the set goals and overall project performance in Kajiado and Kadibo. The evaluation report will be shared widely. Furthermore, SCI agrees to comply with any reporting requirements as a result of funding from the US EPA.

4. Past Performance

a. *Programmatic Capability*

Solar Cookers International has not received federal assistance in the past. Nonetheless SCI has promoted the use of simple, low-cost solar cookers since 1987. SCI's projects have empowered 25,000 families in refugee camps in Kenya and Ethiopia and in two communities in Zimbabwe to cook with the sun. SCI served eastern Africa from its Nairobi office since 1998.

In a four-year project by SCI in Aisha Refugee Camp in Ethiopia, 94% of households adopted solar cookers resulting in a 40% camp-wide fuelwood reduction. Refugees spent a full four to six fewer days each month gathering firewood. In the culturally diverse camp at Kakuma in Kenya, refugee numbers grew from 25,000 to 86,000 during the 8-year project. Families with solar cookers were able to cook even when meager fuelwood rations had run out. They had less need to trade food for wood and charcoal from suppliers outside the camp, saving over 20 kg of maize meal monthly. Twenty-percent of households used solar cookers. In Zimbabwe, UNESCO contracted with SCI to introduce solar cookers in two areas of the country. SCI worked closely with the Development Technology Center of the University of Zimbabwe, local Rotary groups and Girl Guides to spread awareness and encourage sales. About 10,000 families have benefited.

Our projects have confirmed that in areas of scarcity/high cost of cooking fuel, people will adopt, appreciate and reap major benefits from a supplementary new cooking method. We have also confirmed the importance of intensive initial customer instruction and follow-up by local peers as well as the need for steady patience during the several-year start-up process before uptake of solar cooking accelerates. Our refugee and Zimbabwe projects demonstrated that solar cookers save fuel, food, money, and time and shown that large-scale adoption of solar cooking is possible. We have also shown that local women, even those with little or no formal education, are effective at introducing a new technology to their community.

b. *Reporting on Environmental Results – Outcomes and Outputs*

While we do not have a list of performed federally funded assistance agreements, we do have extensive experience in reporting project results. Noteworthy private foundation and World Bank grants include:

- Richard and Rhoda Goldman Fund: $80,000 over two years for a capacity building initiative
- Good Works Institute: $350,000 over five years for capacity building, advocacy, public awareness, and conference support
- Global Village Energy Partnership GAPFund: $80,000 for one year for introduction of solar cooking in Kajiado and Kadibo

The reports of independent evaluation for the SCI projects at Aisha and Kakuma camps are available online at http://www.solarcookers.org/about/programs/aisha.html and http://www.solarcookers.org/about/programs/kakuma.html. A baseline study of pre-intervention conditions in Upper and Lower Nyakach was done in early 2003. The full evaluation of that phase of the Sunny Solutions project is planned for 2008.

Personnel information redacted.

PROPOSAL BUDGET SUMMARY

	TOTAL	Federal	Non- federal
	$	Share(USEPA)	Share (SCI)
Total this Grant	230,000.00	150,000.00	80,000.00
PERSONNEL	$	$	$
Salaries and wages	80,400.00	42,750.00	37,650.00
Fringe benefits	24,120.00	12,825.00	11,295.00
Total	104,520.00	55,575.00	48,945.00
Non Personnel			
Consultant services	18,000.00	9,000.00	9,000.00
Equipments	7,491.00	6,556.00	935.00
Supplies	7,320.00	5,856.00	1,464.00
Travel	22,560.00	12,990.00	9,570.00
Other costs	70,109.40	60,023.00	10,086.40
Total	125,480.40	94,425.00	31,055.40

Budget Details

Federal	Non- federal
Share(USEPA)	Share (SCI)

PERSONNEL	$	$
Salaries and wages		
(1) Regional Director (Nairobi) $1437.5x12 x 2 years x 50%	17,250.00	17,250.00
(1) Project Officer (Nyakach) $ 500 x 12 x 2 years x 50 %	6,000.00	6,000.00
(1) Supervisor (Kadibo) $ 375 x 12 x 2 years x 100%	9,000.00	
(1) Fiscal Officer (Nairobi) $ 800 x 12 x 2 years x 25%	4,800.00	14,400.00
(1) Office Assistant (Nairobi) $ 237.5 x 12 x 2 years x 100%	5,700.00	
Total	42,750.00	37,650.00

Personnel: Fringe benefits Medical and personal Accident insurance covers at 30% of monthly salary (Mandated)	Federal Share(USEPA) $	Non- federal Share (SCI) $
(1) Regional Director (Nairobi) $ 1437.5 x 30% x 12 x 2 years x 50%	5,175.00	5,175.00
(1) Project Officer (Nyakach) $ 500 x 30% x 12 x 2 years x 50%	1,800.00	1,800.00
(1) Supervisor (Kadibo) $ 375 x 30% x 12 x 2 years x 100%	2,700.00	
(1) Fiscal Officer (Nairobi) $ 800 x 30 % x 12 x 2 years x 25%	1,440.00	4,320.00
(1) Office Assistant (Nairobi) $ 237.5 x 30 % x 12 x 2 years x 100%	1,710.00	
Total	**12,825.00**	**11,295.00**

Budget details - Consulting and contract services	Federal Share(USEPA) $	Non- federal Share (SCI) $
Evaluation consultant (Practical Action)	6,000.00	
Mid term review of the project	3,000.00	
End term review of the project		9,000.00
Total	**9,000.00**	**9,000.00**

Budget details - Equipments	Federal Share(USEPA) $	Non- federal Share (SCI) $
Demonstration suppliesi.e cookits,box cookers,fireless, bags e.t.c	3,456.00	935.00
Computer, monitor and printer, 1 laptop @ 1300 & printer	1,600.00	
Desks 2 desks @ $ 300	600.00	
Portable public address system 1 @ $ 900	900.00	
Total	**6,556.00**	**935.00**

Budget details - Non - Personnel : supplies

	Federal Share(USEPA) $	Non- federal Share (SCI) $
Office supplies @ $150 x 12 x 2 years	2,880.00	720.00
Equipment maintenance @ $ 80 x 12 x 2 years	1,536.00	384.00
Public demonstration supplies @ $ 75 x 12 x 2 years	1,440.00	360.00
Total	**5,856.00**	**1,464.00**

Budget Details - Non - Personnel : Travel

	Federal Share(USEPA)	Non- federal Share (SCI)
	$	$
A. International		
1. Airfare - Regional Director - 2 meetings @ $1950	2,400.00	1,500.00
2. Per diem 2 meetings @ $ 900	900.00	900.00
3. Enroute travel expenses (taxis, etc.)	810.00	810.00
B. National		
1. Airfare	900.00	900.00
2. Per diem	900.00	900.00
3. Enroute travel expenses (accommodation)	1,800.00	1,800.00
C. Miscellaneous		
1. Vehicle operation and maintenance	3,360.00	840.00
2. Public transportation allowances	1,920.00	1,920.00
Total	**12,990.00**	**9,570.00**

Budget Details- Non - Personnel : Other costs

	Federal Share(USEPA)	Non- federal Share (SCI)
	$	$
Rent : 40 sq.ft.@2.5$ x 12 x 2 years	1,920.00	480.00
Utilities - $ 100 x 12 x 2 years	1,920.00	480.00
Communications (telephone/mobile phones/fax/internet) $ 500 x12 x 2	9,600.00	2,400.00
Postage and express fees $160 x 12 x 2 years	3,072.00	768.00
Training Workshop & conference costs 32 @ $ 200	6,400.00	
Venue rental fee (per day) $ 40 x 3 x 12 x 2 years	2,304.00	576.00
Materials production @ $ 80 x 12 x 2 years	960.00	960.00
Translation	320.00	320.00
Audit, bookeeping @ 1400 x 2 years	2,240.00	560.00
Testing of the technology aprovecho 2 @ $ 2000	4,000.00	
Demonstrationsof the interventions 25 @ $ 128	2,560.00	1,472.00
Client follow-up 72 @ $ 56	2,627.00	806.40
Stipend for volunteer assistants 8 @ $ 30 x 12 x 2	6,480.00	
Radio Air Time 2 @ 90 x 12 x 2 years	3,456.00	864.00
Sign, billboards, other publicity	2,164.00	400.00
Revolving funds	10,000.00	
Total	**60,023.00**	**10,086.40**

Project Title

MARKET ACCESS TO CLEAN COOKING TECHNOLOGIES IN KENYA

Project/Assistance Agreement Number

XA 83398501

Final Report to the U.S. Environmental Protection Agency for the period 2009 to 2011

Prepared by:

[redacted]

REGIONAL DIRECTOR SOLAR COOKERS INTERNATIONAL (EA)

P.O. BOX 51190 – 00200

NAIROBI, KENYA

Date

28TH SEPTEMBER 2011

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9.2 Project Images

9.3 Project Testimonials

9.4 Samples of Project Communication/Promotional Materials

9.5 Manufacturing and Sales Information

9.6 Stove Performance (M&E Results)

Project Title: MARKET ACCESS TO CLEAN COOKING TECHNOLOGIES FOR HEALTH AND WEALTH IN KENYA

Project Number: XA 83398501

1.0 Executive Summary

1.1 Overall Project Purpose and Goals

PURPOSE: UPSCALLING MARKET ACCESS TO CLEAN COOKING TECHNOLOGIES FOR HEALTH AND WEALTH IN KENYA.

Project Goals: Expand the sales and marketing network for solar cookers, *upesi* stoves and retained heat cookers. Strengthen local access to smoke reducing cooking technologies that complement solar cookers. Reach at least 3,000 households by the end of the project.

1.2 Need / Project Significance

The area, Kadibo in Nyanza Kenya, is a flood prone plain with bear minimum vegetation. The community relies on purchased biomass and agricultural residues for cooking fuel. Prior studies by PA (2008 – 2009) revealed that there were high incidences of smoke related diseases in the area. There were limited economic development opportunities for Women.

1.3 Summary of Major Activities Completed:

Secured funding from USEPA and SCI, signed agreements with partners and the community, conducted market survey with partners, recruited and trained business women, purchased and stocked technologies in project area, identified quality producers, enhanced basic knowledge and awareness on the dangers of indoor air smoke. Sold stoves, installed stoves, monitored usage, maintenance of stoves, progress reviews, documentation and reporting, final evaluation.

1.4 Summary of Major Accomplishments / Results

There is 91% awareness on the dangers of in door air pollution, 2547 households were reached with clean cooking and lighting technologies. From 8 women 42 others became installers and promoters of stoves. Demystified fear of loans and enabled savings through Village Savings and Loans strategy (VSL). Improved community health as well as public and social status by women in the project.

1.5 Conclusion(s)

Offering a menu of stoves is an innovative approach to stoves' commercialization. Combining public education and enabling access to local capital generated within the community enabled asset acquisition, including stoves and solar lamps. This strategy is a boon to project sustainability. From the final smoke monitoring activity it is evident that adoption and use of improved, clean cook stoves enhances household health and wealth.

2.0 Project Approach, Goals, and Objectives

This section should describe the approach taken in this project. In addition, list and briefly describe the project goals and objectives as outlined in your approved grant application.

2.1. Goal 1: Expand the sales and marketing network for solar cookers, *upesi* stoves and retained heat cookers.

SCI's pilot project in the area was in one of the 8 locations (west K'ochieng') where 8 women were recruited and then trained thereafter were given the title (Solar Cooker Representatives – SCOREPs.) in this project they only promoted the solar cookers. The USEPA project as a scaling up project covered all the 8 locations, each woman was charged with promotions and sales per location. In turn, each SCOREP identified several other women who were trained as installers ending with a total of 36 women in the project by June 2011. The 36 women have had an opportunity to earn an income / commission by stocking and installing stoves in the designated locations.

In addition to the women acting as mobile sales points, they were also engaged in marketing / promoting the stoves namely, *Upesi, Uhai*, solar cookits, retained heat cookers and solar lamps towards the end of the project.

2.2 Goal 2: Strengthen local access to smoke reducing cooking technologies that complement solar cookers

Sourcing for assembled quality solar cookits, stocking other types of solar cookers such as Pulsee, SK 14 and box cookers, training the promoters on how to make retained heat cookers, adapting to the local situation and encouraging home made retained heat cookers e.g. (hole on the ground, basin retained heat cookers, sourcing for and stocking affordable solar lamps, training on quality recognition and installation of *upesi* stoves, innovative ways of creating and securing eve-spaces, securing funds to serve the vulnerable members too.

2.3 Goal 3: Reach at least 3,000 households by the end of the project.

After a request by the two project partners to USEPA, the project was extended by another 7 months to afford time to meet project goals. By end of June 2011, the following was achieved:

- 582 solar cookits, 2,126 ***upesi*** stoves, 145 – retained heat cookers , 49 – uhai stoves z(charcoal stoves), 23 – SOLAR LAMPS
- A total of 2,547 households were reached out of 3,000 expected households. This meant that the goal was achieved by 85%. The sub goals of individual interventions was surpassed in relation to ***Upesi*** stoves, under achieved by the solar stove at 29% and retained heat baskets at 73% , while charcoal stoves and solar lamps were additional interventions enhancing the numbers of interventions in the households.

3 Project Activities and Results

3.1. Major project activities completed over the course of the project.

Activity	Verifiable indicator
Signing of final agreements on project funding	Signed project agreement document with USEPA
Signing of a partnership agreement with Practical Action and developing a common work plan,	Letter of agreement filed, Joint work plan
Gaining community acceptance by consulting elders	Copies of letters to the area administration
Establishing and equipping project site office and store	Site office in Kadibo market, furniture, computer and printer purchased.
Capacity building for the SCOREPs to increase their skills and knowledge	3 training workshops (how to make, use and maintain retained heat cookers, how to make quality installation of *upesi* stoves and create eve – spaces, how to assemble Cookits and test water safety). Training workshop reports.
Assigning then to specific work locations	All the 8 women had initially been recruited from one location; they were each assigned to a location to cover all the 8.
Continuous networking with relevant agencies, government departments etc	Joint activities with local administration – chiefs, school principals, health workers, ministry of agriculture, V – Red, VI Agro forestry, Nyando council. Sharing reports, attending local review meetings on area's development.
Development and distribution of educational materials	Flyers, 2009, 2010 and 2011 calendars, brochures, t- shirts, caps, features in SuNews, Solar Cooker Reviews, local language booklets on use and maintenance of solar cookits, WAPIs.
Linkages with MFI	Agreement with VI – Agro forestry to train and found Village Savings and Loans groups – total established (8) groups formed there were non before.

Radio spots and programs	10 radio spots and programs CDs available
Market stimulation and promotional activities	Market survey report, technology demonstrations 47 public demonstrations, 390 group demonstrations, talks to institutions
On site stocking of stoves	At any given time the site store had not less than 100 solar cookits and pots, 5 uhai stoves, 5 upesi stoves and others in the field. Filed stock – take cards.
Sale of stoves	A total of 582.solar cookits sold, 7 box cookers , 2126 upesi, 145 retained heat cookers File records and sale receipts.
Stove installation and creation of eve- spaces (stove installation involves proper positioning of the stove in the cooking area or kitchen where there is a draught and air circulation since it is a fixed cooking position)	This was a paid for service by the buyer to the installer and for every upesi stove installed an eve space was also created to enhance smoke extraction should there be no window. A total of 2126 stoves were installed and 1808 eve – spaces created.
Testing of stove performance	Since there are no protocols for testing solar cookers, only comparative cooking and water boiling tests were undertaken using different solar cookers. Also tests were on performance of a homemade fixed hole – on the ground retained heat cooker and a basket retained heat cooker. Reports filed.
Monitoring, evaluation and reporting	The monitoring structure – Regional Director, project officer, supervisors, SCOREPs, installers. Each level prepared monthly work – plans, when approved, activities would be carried out and then progress reports submitted. Monthly planning meeting minutes, progress reports and quarterly reports shared with donors, monthly budgets and expense reports. Review meeting reports, mid term review and final project evaluation report.

3.2. Major results /outcomes (quantitative and qualitative) obtained towards achieving your project goals.

Quantifiable project results	**Numbers**
People with knowledge about the dangers of in door air pollution in Kadibo	**70,000**
Households educated on and using interventions that reduce indoor air pollution Number of people with reduced indoor air pollution	**2,574** **15,444**
Numbers of institutions / small businesses using pollution reducing interventions	**24**
Numbers of vendors/ installers / SCOREPs doing stoves business	**45**
Improvements in quality of life - (These are anecdotal see annexes)	As per the final evaluation findings: improved hygiene around the cooking area, families bonding (even husbands can sit in kitchens to discuss issues, or return home early), , improved incomes by stove sellers, meeting family needs from savings made by not buying fuel wood all the time or paraffin for lighting, VSL's . Enhanced community knowledge and skills on issues of smoke and health and environmental consciousness. Improved community cohesion from stakeholder consultation forums, networking, and exchange of ideas. Emergence and increase in number of entrepreneurs doing a variety of businesses. New kitchens constructed so that the new stove can be installed.
Reduction in incidences of disease severity in Kadibo	Less prevalence of respiratory diseases symptoms reported in the health centers

3.3. Summarize the previous household energy and health situation of the target population and demonstrate how this project improved their health, livelihood, and quality of life.

3.3.1 Describe the current awareness of the negative impacts of inefficient and unhealthy cooking and heating practices and available solutions compared to project initiation.

Current awareness levels are rated at 91% (final evaluation report August 2011). This is due to the use of several strategies and approaches in educating the public and raising awareness. Use of women to pass on the message since in the Kadibo community, cooking is a women's activity. Use of radio programs in local language, flyers and calendars all translated into local language, door to door campaigns, songs, skits, posters with data on dangers of smoke. The high level of awareness is evident in all age groups from young to old men and women to school going children, this is was observable from the fact that the children are familiar with the technologies, they can name them, state where they have seen them and if they have used them or eaten foods cooked using the interventions.

Prior to the project, awareness that smoke is a silent killer was very low at 25 % now stands at 91%.

3.3.2 Describe the increase in demand that was created as a result of your project.

Increase in demand was evidenced by the number of sales beyond the project scope / area, in addition to even men setting up stoves business. *Increase of sales beyond the project area, Musoma in Tanzania with Global Resource Alliance organization. Jinja, in Uganda with Light Gives Heat organization.* ***Mama na Dada*** Ndori Kenya. Banana women group Mbita support group and Cham Kacha all in Mbita. Bondo, Kisii and Homa Bay MSF(multi-stakeholders forums)

The increase also evident from the numbers of stoves purchased for stocking with local installers – moving from 2 to 5 and eventually to 10 stoves per month.

3.4 Describe the commercial enterprise that was scaled up during this project

Beginning with 8 women who were doing business in other products, SCI – USEPA project has ended up with 45 women and 2 men who are well known in the community as stove promoters. At each level, there was a commission of profit kept by the SCOREP / installer. Installation service was 50/= shillings, from the sell of the ***upesi*** the seller kept 50/= and from the sale of the cookit one kept 140/= (1.5$), and from the fireless as well.

The project scope was in all 8 locations with a population of 61,326 (2009 census)

The Kebuye tin smiths, Keyo Women Group in Kisumu, Amani pottery in Siaya, Dismas Onyango sales Kerosene in Rabuor market, Leah a SCOREP used to make aloe herbal soap but has expanded to assembling stoves, fireless baskets, Leonida kept chickens and rice farming she has bought a generator and has expanded her acreage of rice and number of chickens she is keeping

3.5. **Describe the performance of the technologies, fuels, and/or practices that were promoted and how they evolved over the project period. What is the fuel wood consumption compared to the local traditional cooking practices**? What test methods were used to evaluate the performance of your stoves (e.g., water boiling test, controlled cooking test, kitchen performance test)? What did you learn from these tests and how did you use these test results to improve your program?

How are your stove(s) performing? *Please provide information on the type of laboratory and field testing you have performed to determine the effectiveness of your stove(s).*

Type of Stove	**Test Performed (CCT)**	**Date**	**Emissions**	**Fuel Use**	**Other Indicators Used**
Cookit	Baking cake took 2hrs	14/10/2009	None	Sun	
Uhai	Baking took 3.5 hrs,+ charcoal had to be bought, lit and the use of two pot when baking.	14/10/2009	Yes as it was being lit.	Charcoal	Burnt aroma of the cake
Upesi portable	Baking took 4 hours. Buying firewood time to light up and get hot coals, the use of two pots when baking. It had to be attended to and to maintain temperatures.	14/10/2009	While in process of lighting and getting hot coals	Firewood	Burnt aroma of cake
Type of Stove	**Test Performed (WBT)**	**Date**	**Emissions**	**Fuel Use**	**Other Indicators Used**
Cookit	Pasteurization of 3ltrs of water took 2hrs 50min	11/11/2009	None	Sun	WAPI melts at 65 Centigrade
Pulsee	Boiling 3ltrs of water took 21mins.	11/11/2009	None	Sun	Bubbles
Parabolic	Boiling 3ltrs of water took 39mins.	11/11/2009	none	sun	Bubbles

How are your stove(s) performing? *Please provide information on the type of laboratory and field testing you have performed to determine the effectiveness of your stove(s).*

Type of Stove	Test Performed WBT	Date	Emissions	Fuel Use	Other Indicators Used
Gas stove	Water pasteurization of 5 litres of water. It took 45mins	8/2/2010	Bubbles & vapour	Gas	WAPI melted at 65%c
Cookit	Water pasteurization of 3 litres of water. It took 3 hours	5/3/2010		Sun	WAPI melted at 65%c

How are your stove(s) performing? *Please provide information on the type of laboratory and field testing you have performed to determine the effectiveness of your stove(s).*

Type of Stove	Test Performed KPT	Date	Emissions	Fuel Use	Other Indicators Used
Upesi	Kitchen Performance Test	30th June 2010	Smoke at lighting and	firewood	Wight of firewood - 6kgs at 13hrs 18min. 6kgs

	Cooking ugali from a cold start.		some during cooking		• Time taken to light the stove 10 mins. • 15 mins to bring water to rolling boil • It took 10 min for cooking process to completion. • Weight of firewood after and remaining hot coals. It took 0.8kg to cook the ugali (6kgs-5.2=0.8)
3 stones	Kitchen Performance Test	30th June 2010	Smoke at lighting time	firewood	Weight of firewood 6kgs at 13hrs 18min. 6kgs 30 mins to light the stoves 13 min for the water to come to rolling boil 6 min to cook the ugali Weight of remaining firewood and hot coals. It took 1.5kg to cook the food(6kgs-4.5=1.5)
Conclusion					The Upesi still performed better at conserving firewood despite taking longer to finish the cooking.

- The tests generated knowledge that was included in the flyers to educate the communities.
- The results of the tests enabled increase in sales and convinced those in doubt about the performance of the interventions.
- The tests convinced people that using the interventions resulted into saving income for other felt needs.(see picture of piggy bank savings)
- Since there were no protocols for testing solar cookers, we could only undertake comparative tests with different solar cookers and demonstrate that some were fast but required tending to while others were slower, needed no constant attention and got the job done eventually.

3.6 Describe the manufacturing process and methods for assuring quality control of the stoves.

- The SCOREPs were trained on quality recognition for upesi and retained heat cookers and also got them ready made from assured producers.
- Other stoves e.g. the Cookit came already assembled but bore the mark of quality from the OYWA innovation (PAWII Awards 2005 Ghana) Pan African Women Inventors and Innovators Award. This is the coloured cloth binding on the edge of the CooKit, it makes it more durable – up to 3 years with good handling. Solar lamps were purchased ready made with the quality mark of Kenya Bureau of standards and performance testing and recommendation of Lighting Africa project. These came with a one year guarantee and any defaults have been replaced.

3.7. Describe any IAP monitoring and evaluation protocols (and/or equipment) you used and any results from M&E activities.

- With our partners Practical Action, smoke monitoring was performed at the end of the project using ***Gas Badge pro instrument.*** A mid term monitoring activity failed to take off since the partner too long to secure the instuments.
- Other than the above home visits during the project life served as occasions for monitoring stove and eve -space performance with regards smoke extraction from the house hold. This was by observation.
- Feedback from customers and referrals made by them.
- Comments such as *" I can now sit with my wife and chat as she cooks since this stove was installed as it produces less smoke than the previous traditional stove"*

3.8. Describe your environmental and health outcomes and how you tracked and measured progress in those areas.

Increase in vegetative cover in the area. Due to the reduction in the need to forage for biomass fuels. Less smoke emitted to the environment hence reduction in global warming at the community level.

Improved environmental consciousness in the community due to intensive public education campaigns resulting into 91% awareness. Use of less biomass has enabled regeneration of shrubs, home and garden fences and even some soil conserving plants like aloe Vera and sisal. The general hygiene around the kitchens and cooking areas are clean and to a significant extent use of improved stoves and other complementing technologies has helped reduce green house gas emissions.

4 Partnerships/Collaboration

Describe collaboration with outside organizations (i.e., local, regional and national governments, NGOs, academic institutions, others) that assisted you in this project and summarize their role on the project.

Government departments:	
• Ministry of Agriculture	Access to Government plans use of planned events to demonstrate stoves
• Ministry of Education	Access to students and teachers for knowledge and skills sustainability
• Ministry of Public Health and Sanitation	Health monitoring, complimenting public education on dangers of smoke.
• Provincial Administration	Community entry, security and support as these are opinion leaders. Use of their public forums " barazas"
	Recognition of project and shared reports on the development progress of the area.
Other Development partners / agencies	
• VI Agroforestry	Training and institutionalizing the Village savings and Loans strategy, local capital generation and business sustenance.
• VIRED, VI SSCI, UN HABITAT, KASDEG	Shared events for promotion and public awareness, support to the program
•	
• Ramogi Institute of Science and Technology	Seeking serious partnership and including household energy technologies in their curriculum.
• Churches	Access to their members - use to give talks on dangers of smoke and reach members in a consistent manner.
• Kadibo community	Access and cooperation and allowing wives to be part of the project implementation as promoters and installers, and for buying and using the technologies.

• Lift Up Africa, Nancy Ellen Crooks Foundation and American Peace Corps,	Funding to enable the vulnerable acquire stoves and enjoy the benefits of reduced exposure to indoor air.
• Suppliers	Keyo women group, Nduru women group for quality upesi stoves, Clemrose for fireless baskets, Pressmasters, Dhodhia for carton materials and reflector foils and Androclovi for the glue.
• Contractuals	For quality assembly of CooKits
• Practical Action (EA)	For undertaking the smoke monitoring at the end of the project to verify project impact
• Apptech consultants	For undertaking the final project evaluation
• International and regional conference organizers	For enabling dissemination of project strategies and sharing them globally.
• Radio Nam Lolwe and Radio Victoria • Light Gives Heat (Uganda) and Global Resource Alliance(Tanzania)	Enabling outreach to a wider varied audience on the gravity of the issue at hand- dangers of indoor air pollution and how it can be alleviated. Extending project benefits beyond the border.

4.2. Summarize the contribution of partners (i.e., financial, other) towards achieving your project goals.

- USEPA gave us the bulk of the funding at US$ 150,000
- And SCI US$ 80,000.
- Lift Up Africa US$ 1,000 to enable the vulnerable acquire the interventions
- Practical Action provided base line data on smoke levels in the community and fuel measurements

4.3. Discuss how the Partnership for Clean Indoor Air or its member Partners helped to advance your program's activities.

- The website was very useful especially the resources section, the experiences and conferences gave us a chance to share / disseminate
- Project achievements. Lessons learned from other PCIA partners' experiences have been very helpful in advancing personal knowledge
- PCIA and members provided training and capacity building on stove tests, carbon financing options that are available.
- Networking with members, peer affirmation and encouragement
- Visit by USEPA co-coordinators boosted the project image
- Training on monitoring and evaluation impact evaluation
- Dissemination of results through paper presentation and posters, flyers at the conferences attended by the Regional Director SCI(EA)

5 Marketing / Promotional Activities

5.1. Describe successful approaches you used to promote/market the technologies or fuels of your project.

Public, group cooking demonstrations and as well as comparative performance demonstrations of various stoves. Radio spots and live radio talks were listeners can call in and ask questions or comment. Songs, skits, t- shirts and caps, flyers and calendars with messages. Talks to schools and institutions and actual cooking demonstrations. The model kitchen was a major hit as it showed all the interventions the project was promoting and any interested buyer could see how to place / install, and how they were being used. Once a week on market days cooking demonstrations were conducted in it. (Samples in Annex).

5.2. Describe any refinements you made to your communication/promotional approaches or materials over the course of the project.

- Moved from group / public demonstration to door to door campaign hich gave chance to monitoring on the stove performance, gain feedback on family health (asthmatic, eye irritation .
- From radio spot to live talk shows were listeners can call in and ask questions
- Sunews, calendars, flyers
- Had offer periods especially towards Christmas festivity to boost sales.
- From A4 size flyers to A5 colored info pack brochures.
- Belonging to networks- Kenya Energy and Gender network (Energy Kenya). EAEN(East African Environmental Net Work .
- Sunews 4,000 copies hard copies are distributed annually and a copy posted on the website (www.solarcookers.org)
- Put up a model kitchen with all the interventions in the Rabuor market with an average of 50 visitors per week
- Still photos to display during events
- Public address system to help mobilize the crowd and pass the IAP massage.
- Bata exchange for the interventions. (Poultry, cereals) for lack of cash.

- Branding of the project track.
- Cell phones for SCOREPS and printed contacts so they can be called back
- Community feedback through reviews forum.
- From small office space to bigger office space with adequate meeting room and storage facility.

5.2. Describe how you communicated to a broader audience (i.e., the global community) about your project and its goals, activities, and results (i.e., have you presented at conferences, published papers, etc.?)

- The website was very useful especially the resources section, the experiences and conferences gave us a chance to share / disseminate
- radio spot for announcements and live talk shows were listeners can call in and ask questions
- Sunews, calendars, flyers
- Sunews 4,000 copies hard copies are distributed annually and a copy on the website
- Public address system to help bring the crowd and pass the IAP massage.
- Dissemination of results through paper presentation and posters, flyers at the conferences attended by the Regional Director SCI(EA)

6 Lessons Learned / Sustainability / Replication

6.1. Overall project lessons learned (including a description of any major obstacles faced, how these were addressed, and how this learning fed back into the project moving forward).

- Weather. Flooding during rainy seasons, the roads are impassable, so the SCOREPS and installers go on foot and are assisted with mud boots and umbrellas. Follow up by phone rather than home visits.
- Culture is an impediment since it believed that the kitchen is the domain of women and not men but with continues education and awareness during the project life, using T-shirts, Flyers, and calendars, this was overcome.
- Technical challenges in the area include black cotton soil and lack stones it becomes difficult to install the stoves as these are required for the base of the stoves. Use of clay from old abandoned houses or anthills, or broken fired bricks.
- The installers at times encountered rodents and snakes in some the houses – this delayed work as they rodents / snakes were dealt with and then work proceeded.
- The ***upesi*** liners weigh 10kgs so it is a challenge to transport and store, stocked the stoves in homes as close as possible to the installers.
- Poverty. Encouraged them to do barter trade poultry and cereals for the interventions. Installment payments. Seek donors to assist the vulnerable
- Had high profile visitors in the course of the project life. Minister of Agriculture, Deputy Prime Minister, Rotarians etc
-

6.2. Specific lessons learned by Goal Area (per Section 2.0 and if relevant).

- **In quarter 9**, door to door campaigns have been effective in engaging the community in discussions on dangers of smoke
- Model kitchen has been effective in the interventions seeing is believing.
- Selective promotional offer e.g. Christmas promotion have been effective in enhancing market stimulation and technology acquisition.
- **In quarter 8**, the dangers of smoke massage is positively responded to by men when approached from the health angle
- Participatory review of project progress with the beneficiaries and implementers enhanced project acceptance and a sense of ownership.
- People start from the known to unknown. There is a process 3stones stove to ***upesi*** stove. Heat retention cooker, and then the new ones like gas cookers, the solar cookers and ethanol stoves
- Correct targeting is essential in communities were gender roles are defined. Women are associated with the kitchen and cooking issues.
- **In quarter 7.** Village Savings and Loan demystified the fear of loans and savings and enabled local capital generation for the business and meeting other felt needs.
- **In quarter 6.** Awareness does not always end up in sales of the interventions due to other factors
- Cost of asset e.g. stove or cell phone depends on the need it would serve and the priority of family spending
- The demand from areas outside the project is indicative of the national need. These were met as much as was possible.
- **Partnership** the requirement for joint project implementation plan impeded rather than enhancing project performance. There was unhealthy competition among the entrepreneurs and also in price setting. Weekly meeting during VSL assisted the two sides to bond and work amicably.

6.3. Describe the sustainability of your project within the target community (i.e. after your project ends, what elements have you put in place to ensure your results continue?)

- The installers and SCOREPS are in the VSL they are able collect money and continue with the business of the interventions. They have been able to borrow money from VSL and pay back with some interest.
- Knowledge and skills are within the community.
- The involvement of different actors e.g. Government departments, NGO's is a boost to project sustainability
- The model kitchen and the interventions there in can be used for the next 10 or so years
- The emergence of production centers /groups producers will enable current and future access

6.4. Describe any guidance you can provide for others looking to conduct a scale-up project or to replicate your approach.

- Plan to include the dangers of smoke / health lessons in the national education curriculum.
- Policy influence should be a goal for project implementers and should be implemented.
- Adopt integrated approach i.e. offer a menu of stoves

- Aim for a longer project period, such a project touches on culture and attitude change
- Periodic monitoring of IAP and the results used to help promote the project.

7 Conclusions

This section should discuss the major conclusions and findings from the project.

- Awareness levels on the dangers of smoke stands at 91% currently signifying that the strategies used in raising awareness and educating the public were successful.
- Smoke monitoring at the end of the project indicated that pollution was high in the evenings as this is when family meals were being cooked and also when everyone was indoors.
- That the project was gender sensitive in that 96.3 percent of the random sample in the study happened to be women.
- That there was sufficient market stimulation to the extent that there were more people joining in as promoters and installers that at the beginning of the project. There were less than 20 promoters at the beginning of the project and a the end there were 81 both for Practical Action and Solar Cookers International. Specifically SCI begun with 8 SCOREPS and ended up with a total of 28. It is significant to note that even men joined in the promotion and sales.
- The economy of the community was enhanced due to the gainful engagement and earnings of commissions from sales by those involved.
- Some project strategies especially the Village Savings and Loans (VSL) helped to demystify the fear of loans and encouraged savings and borrowing in the community a total of 8 such groups were in existence at the end of the project.
- Community health improved as evidenced in the anecdotal narrations by beneficiaries but also corroborated by reports from the health facilities in the area. This in turn boosted environmental awareness and conservation as less biomass was used up.
- There was positive synergy amongst all stakeholders, the government, the school system other development partners, the beneficiaries and this enhanced project acceptance and institutionalization.
- The promoters evolved innovative ways to meet the challenges they met in the field and this endeared them to the community and enabled more acceptance. For example: Where there were no stones or good clay they would use clay from an old abandoned house or clay from an anthill. Where cash was lacking they accepted in-kind contributions like grains and chickens.

- Adequate and timely disbursement of funds for project needs as well as the project site office boosted the image of the project.
- Since cooking is considered to be a gender based activity, they use of women as promoters and the use of several social media strategies enhanced achievement of the project.
- That socio – cultural barriers as well as poverty were still a major impediment towards technology acquisition. And that extensive marketing and promotion do not necessarily translate into big sales.

8 Financial Summary

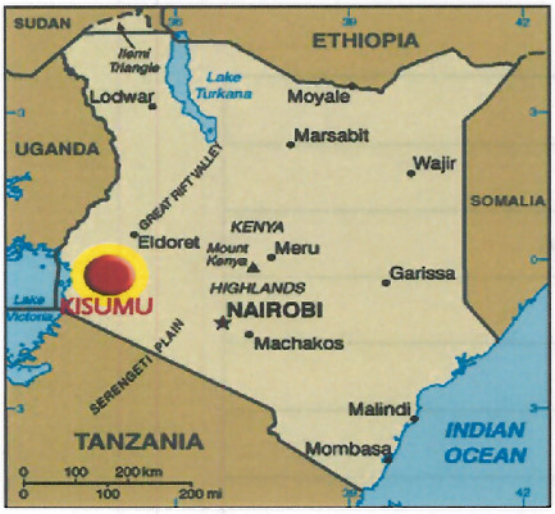
Project summary details *Enter the details as they appear in the grant award document.*	
Date of award (*as stamped on award)*	
Project period start and end dates	January 2009 – 31st July 2011
Actual start date (if different)	
Total USEPA budget	150,000 USD
Total co funding (if applicable)	80,000 USD
Total project budget	230,000 USD

Project budget details	Qrt 1	Qrt 2	Qrt 3	Qrt 4	Qrt 5	Qrt 6	Qrt 7	Qrt 8
Amount spent each quarter	17,144.06	13,833.85	10,487.54	18,032.02	27,019.17	21,891.17	23,244.32	23,178.18
Amount reimbursed each quarter	15,000	25,894.05	-	30,000	10,000	20,000	15,000	34,105.95
Amount remaining in project budget	135,000	109,106	109,106	79,106	69,106	49,105.95	34,105.95	NIL

Supplemental Materials

9.1. Map and Description of Project Location(s)

Map of Kenya and Major Towns.



Description of the project location,

Kadibo division is one of the divisions of Kisumu east District. This is an administrative unit and the central government representative is the District officer. The Division has 8 locations namely; Kochieng east ,Kochieng west, Kombura , Katho, Kanyagwal, Kawino south, Kawino north and Bwanda . Rabuor center is the headquarters of Kadibo division and it is 10 minutes drive to or from Kisumu on the main Nairobi Kisumu highway. To the west Kadibo division borders Lake Victoria, most of the land is flat and Kadibo is a flood prone area. It has sparse vegetation and black cotton soil that supports thorny bushes and euphorbia mainly for fencing homes and farms. Other common plants are aloe family of plants and sisal. The altitude of Kadibo is is 1200, rain fall 700-1200mm these are erratic and Kadibo suffers long dry spells.

The main economic activities include fishing and farming, petty businesses involving farm produce, fish, firewood and charcoal, smiths to repair stoves and fabricate new ones, peasant farming growing rice, sugarcane, millet and sometimes maize. Other activities include: formal employment in schools, government offices other NGOs, food vendors, transporters on bicycles and motorbikes and grocery shops.

The population of Kadibo stood at 61,326 at the last census and females comprise 52.3% of the population. Estimated number of households stands at 12,994. Most of the people inhabiting Kadibo are of Luo ethnicity and are Nilotic. Their diet comprises of three meals a day and the main staple is UGALI, made from maize meal. This is consumed with vegetables, fish, meat, chicken or beans etc. Famine to Luos mean not being able to have ugali at least twice daily.

Socially, they are friendly people and are stockers their culture and traditions and so polygamy is wide spread, large families are valued and Christianity is the main religion though split up into numerous sects.

Because of the situation described above, Kadibo people were prone to frequent flooding and there is a general tendency towards handout expectation especially from NGOs. They are lovable people and are positive to change as they are close to Kisumu city.

9.2. Project Images

Include any electronic images related to the implementation of the project. (Please provide a brief caption or description for each image provided).

COUNTING MONEY SAVED FROM THE PIGGY BANK AFTER USING THE INTERVENTIONS

CASHING IN ON THE STIMULATED MARKET, EVEN MEN ARE INVOLVED IN SALES

MODEL KITCHEN AT RABUOR MARKET

INSIDE THE MODEL KITCHEN

THE SCOREPS AND INSTALLERS WITH T- SHIRTS DEPICTING IAP MASSAGES

CONTROLLED COOKING TEST 1

Weighing fire wood

Bringing water to boil in ***upesi***

Cooking UGALI

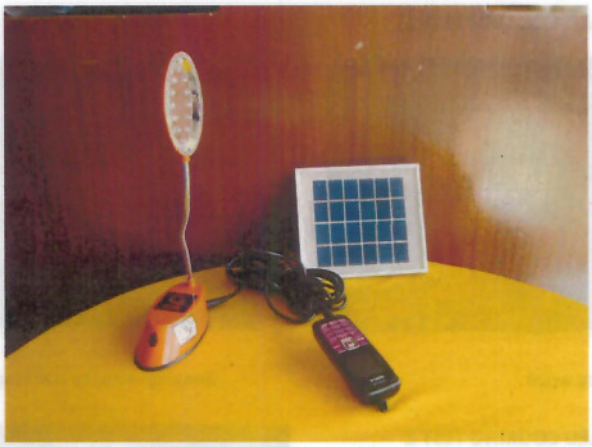
CONTROLLED COOKING TEST 2

Bringing water to boil in three stone fire

Cooking UGALI

Weighing the remaining firewood from the two cooking tests.

FROM THIS TYPE OF LIGHTING KEROSIN



TO THIS TYPE OF LIGHTING SOLAR LAMP WITH CELL PHONE CHARGER

9.3. Project Testimonials

Include personal stories, quotations, or testimonials from: members of your project team; Partners; or consumers who benefitted from your project and that demonstrate how your project impacted the communities you served.

SONG

Wan wadhio ka solar, wan wadhi adiera, wan wadhio ka sola wan wadhi tedo gi chieng'

Kairo odong' kodi kanyo wan wadhi, wan adhi ka sola wan wadhi tedo gi chieng, kadondo odong' kodi kanyo, wan wadhi wan wadhi ka solar wan wadhi tedo gi chieng', ka tuoche odong' kodi kanyo wan wadhi wan wadhi ka sola wan wadhi tedo gi ching'!

We are going to the solar people, we are going to cook with the sun, if you chose to remain in smoke, that is your problem, if you chose to forage for fuel that is your problem, if you chose to remain with illness that is you problem, but as for us we are going to cook with the sun.

[redacted] *"I can now address a large group of people. Different people come to my house to see the interventions. I recall my school days as I can write reports in English. I feel important when I carry my bag and leave the house – people say am going to the office. I have traveled to different areas promoting and teaching about smoke and the technologies. I have sold 82 interventions and I work with 4 other women as stockists and installers*

[redacted] ***is a widow from Kanyang' village in Kadibo.*** *She is one of the villagers who resisted change until she had a one to one discussion on dangers of indoor air smoke during a home visit session. At the time of the visit she was cooking and it was difficult to sit and talk in her kitchen. This provided a perfect illustration to the SCOREP who pointed out, the difficulty in breathing, coughs, sneezes, watering eyes and Dorine added " headaches, chest pain, general aches.." The two ended up with a hearty laugh.*

[redacted] *ended up acquiring the stoves by giving up some of her grains in exchange. When visited she said " My life has changed a great deal since I switched from traditional stove to the new stoves. I do not struggle to forage for firewood as I did before, I have reduced on my spending on medicines. Look, my kitchen is clean and not smoky we have sat in here all along."*

[redacted] wrote: " I am a trained trainer- wow – just 5 years ago I was a housewife and a peasant farmer but now I am a respected leader in my community. I know so much. I know that water has bacteria and I can kill them in my solar cooker, that smoke causes ill health and I can prevent that by using the interventions that I promote and teach about, that I can save money by using a multiple of the technologies especially the fireless cooker in combination with ***upesi***. When I go and teach I earn an allowance and when I sell a technology I have a commission. I tell you, my life has really changed and am able to take care of my family and also buy a few nice personal effects! I have joined my colleagues in saving at the VSL and we meet every Thursday this has really boosted our capital and we have bonded well with each other.

9.4 SAMPLES OF PROJECT COMMUNICATION/PROMOTIONAL MATERIALS

Sayings " *[redacted] iro ok ber kod ngimani, ked kod iro*" " *smoke is not good for your health fight smoke*"

Chief of an area " mondwa wengegi leer!" " our women have bright clean faces" in reference to reduced exposure to smoke.

" Hera omedore" " Love has increased" a woman with two upesi stoves since her husband comes home earlier even as she is still cooking the evening meal. Previously he would come in late due to the house being smoky!

I have a new kitchen! My husband bought two upesi stoves and immediately pulled down the old one, my new stoves are perfect and I have a fireless cooker made from an old basin" I am very happy and healthy too.

[redacted]

FEEDBACK FROM PARTNERS.....

From: [redacted]
To: [redacted]
Sent: Monday, February 28, 2011 12:53 PM
Subject: Re: visit to kisumu

Hello,

[redacted] made it safely back to Jinja. We wanted to thank you for showing us your projects and teaching us all about solar cookers. We are now more excited than ever to start the project. You two were great hosts and we thank you so much! Look forward to working with you more!

[redacted]

Dear [redacted], How are you today? Of course, it is bright and sunny in Jinja and we have our CookIt out on the front lawn pasteurizing drinking water for the tailors.

I am writing to you today to say how very impressed we were by John and Julius' training last week. Their positive attitude and flexibility were wonderful. They were energetic and engaged with all of the groups, even in the rain and the mud. They worked so well with our staff and consistently used teamwork to achieve great results throughout the week. John and Julius were very knowledgeable about all of the cooking methods and were able to transfer this knowledge to our employees. The demonstrations and lessons were very interesting and John and Julius worked hard to ensure everyone's participation and understanding. We are very pleased with last week's training and look forward to working with everyone in the future. We will keep you informed about our group's progress and use of the CookIt and fireless basket.

Thank you again for your team's hard work and effort.

[redacted]

Light Gives Heat, Jinja, Uganda

.....

From: [redacted]
To: [redacted]
Sent: Tuesday, August 9, 2011 10:38 AM
Subject: RE: Solar Day in Sindo

[redacted]

This is awesome! Thanks for sharing. And thanks to Howard and the NECF for your support! This is exactly what the foundation wanted to do. I'm sending this in to Washington to go into the Africa Region newsletter. Keep up the excellent work! Steve

[redacted]
Sent: Saturday, July 02, 2011 8:28 AM
[redacted]
Subject: Solar Day in Sindo

Find attached both some photos and details on our Solar Day in Sindo on 18 June 2011. Once again a big thank you to all at Solar Cookers International (just great training) and our benefactors with the Nancy Ellen Crooks Foundation (absolutely a fine tribute Nancy). I can send more photos if wanted. Even a video clip of [redacted] from SCI leading the singing and dancing.

I also need to acknowledge my friend [redacted] She was my chief organizer and the perfect hostess to all the guests. It is through her that we will maintain contact and follow-up on those that have the CookIts. I have already been at several homes to share a solar meal.

[redacted]
Sindo, Nyanza
[redacted]
Psalms 121:1-8

----- Forwarded Message -----
From: [redacted]
To: [redacted]
Sent: Monday, November 15, 2010 11:31 PM
Subject: [New post] Solar Cookers International

Solar Cookers International

Yasmene Salhia | November 7, 2010 at 14:33 | Tags: cook, Developing country, Energy, Fuel, Kenya, Renewable, Solar, Solar cooker, Solar Cookers International, Solar energy, Technology, water | Categories: Uncategorized, get involved | URL: http://wp.me/p123QX-60

SOLAR COOKERS INTERNATIONAL

When you give money to charity, one often wonders ... does it make a difference? After spending time in Kenya with Solar Cookers International, I witnessed just how much of a difference it can make.

Solar cooking is the simplest, safest, most convenient way to cook food without consuming fuels or heating up the kitchen. Many people choose to solar cook for these reasons. But for hundreds of millions of people around the world who cook over fires fueled by wood or dung, and who walk for miles to collect wood or spend much of their meager incomes on fuel, solar cooking is more than a choice — it is a blessing.

Inexpensive, effective solar cookers can be life-saving tools, not only for cooking but also for pasteurization of drinking water. Over 1 billion people do not have access to safe water. Preventable waterborne diseases are responsible for approximately 80% of all illnesses and deaths in the developing world.

More than 4,000 children under 5 die from diarrhea ... everyday.

In partnership with local agencies, Solar Cookers International (SCI) has enabled thousands of families in multiple countries to cook food and pasteurize water with simple solar cookers. To ensure long-term project viability and access to affordable cookers, SCI works to incorporate solar cookers into local economies through establishment of independent solar cooker businesses run mostly by women.

Local participants are involved in project development from day one. SCI and its partners meet with community leaders and women's representatives for extensive discussions, question and answer sessions, and demonstrations of solar cooking's applicability to local foods.

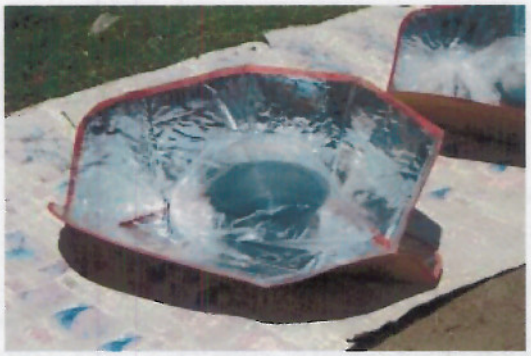
Refugees and other displaced people frequently lack access to sufficient cooking fuels and safe drinking water. In refugee camps, when fuel rations are depleted, women and children often must walk for miles — risking rape and other dangers — to collect firewood from ever-diminishing sources. This physically arduous activity limits opportunity for education, participation in civic life, and income-generating activities. To save fuel, refugee families sometimes sacrifice nutritious foods like beans, which require hours of cooking, for quicker-cooking, less nutritious foods. They may even trade some of their meager food rations in exchange for firewood from neighboring populations, further reducing nutrition.

SCI has enabled thousands of refugee families in multiple countries to cook food and pasteurize water with simple solar cookers. Surveys reveal that the solar cookers allow them on average to save 27% of their firewood, while some report savings up to 70%. No longer forced to trade food rations for wood, refugees have been able to increase their food consumption by an average of four servings daily.

For more information on how you can MAKE A REAL DIFFERENCE, contact Solar Cookers International.

Watch the video on my YouTube page Living Borderless.

Hope you 'like' it!



Oywa Cookit

USEPA Project Staff

Home Visit

Retained Heat Cooker

Hole on the ground retained Heat Cooker

Happy Scorep –SELESSA

Twin Upesi installation

Drinking Pasteurized Water

Vulnerable Beneficiaries.

Exchanging Chicken for the stove

Situation Before

Sticks for the fire

Happy SCOREPS with a cake

RIAT College students

FEEDBACK FROM PARTNERS

RAMOGI INSTITUTE OF ADVANCED TECHNOLOGY,

P.O. BOX 1738, KISUMU.

14th April 2011

TO : THE REGIONAL DIRECTOR,

SOLAR COOKER INTERNATIONAL (EA)

P.O BOX 51190-0200, NAIROBI-KENYA

Dear Madam,

REF: APPRECIATION TOWARDS YOUR VISITATION TO OUR INSTITUTION

We highly appreciate your extended courtesy and demonstrated kindness you made by visiting our institution on Friday 1st April, 2011.

Thank you a million for taking your time talking with us amidst your most busy schedule. We sincerely appreciate the time you spent enlighting us on your programmes focusing on the solar cooking technologies. Your information about how the solar energy has been harnessed in various forms to achieve heat energy utilized in cooking, sterilization, steam boiling and environment management left us awash with rich solar technology ideas. Indeed, your advice was very helpful and gave us a new perspective on available opportunities.

We especially appreciate your offer to connect us to other networks such as Barefoot Solar in India, Habitat and the like.

We are highly elated by your acceptance to form collaboration with our institution towards the capacity building and training in solar energy. Currently a task force has been formed to draft the proposed memorandum of understanding (MOU) and is soon coming up with the document. A copy will be sent for your perusal and possible amendments.

Any additional suggestions you may have would be welcome.

Best Regards,

COORDINATOR RIAT ENERGY CENTRE

Results Dissemination:

Eleventh World Renewable Energy Conference WREC X1 – Abu Dhabi, United Arab Emirates, September 2010.

Paper Title: Overcoming Challenges in Energy Technology Entrepreneurship

[redacted] – Regional Director, Solar Cookers International (EA), Tel: +254 20 4347295, +254722305895,

Email: [redacted]sci@iconnect.co.ke

Abstract:

Introduction:

"Buy a wood stove?" what a joke – why should I pay money - a shallow hole in the ground and three stones is all I need and there – I have a stove!" This is the attitude that energy entrepreneurs have to contend with in selling a variety of cooking stoves. However, with an initial investment, an assurance on better health for the family, economic savings and other social benefits, a group of 25 dedicated women in the Kadibo area of Nyanza Province Kenya, are overcoming this attitude and are selling cook stoves.

Challenges

The main challenges included: Lack of health information, access to affordable technologies, cultural barriers, low income vice versa competing family needs, attitudes, sustainability and seed funding.

Technologies

With financial support from USEPA, Solar Cookers International (EA) and Practical Action (EA) are promoting a range of improved cook stoves aimed at reducing indoor air pollution. These are: improved wood stoves, "UPESI", a solar Cookit, Fireless cooker, Rocket stoves, improved charcoal stoves (KCJ) and Gas stoves. In addition to these the women also create eves, and for those who can afford they construct chimneys to assist in smoke extraction.

Methods

The methods used include: awareness raising, identification of local women who show interest, capacity building trainings on: marketing skills, record keeping, stove installation, making of the retained heat cookers and quality assurance. Further, they are educated on the dangers of smoke to health, and are equipped with promotional materials. In addition, they are enabled to access the initial stoves while linkages are made with Village Savings and Loans organizations that enable them to save and borrow money to grow their stoves business.

Results

After one year, there is 98% awareness in the area on the dangers of indoor air smoke. Adopters begin with the improved wood stove, then to fireless basket, solar cookers and finally to the more expensive gas stoves. 1,500 stoves have already been installed in homes most preferring a double stove installation. 200 fireless cookers sold and 90 solar Cookits, 30 gas stoves, 15 refills, and 1,300 eve spaces created and 1 chimney constructed. The women have together managed to save 150,000/= KSH - (2,000$), that they are loaned to grow their energy technology business. Two local potter's groups are now making and firing quality ceramic stoves in the area.

Lessons Learned

Challenges to cooking technology switch and adoption can be overcome: through social marketing, health education approach, demonstrated economic gains, affordable menu of stoves and consistent promotional educational activities in all sectors of the society and more so if the promoters are women. Seed funding, monitoring of initial activities and consistent promotions for a period of time is critical for nurturing successful sustainable energy entrepreneurship.

Some comments from visitor's book at the Kadibo office.....

4/2/10	Veronica Kirogo	Min. Agriculture Kilimo 0721434443	Excellent presentation looking forward to stronger partnership.
19/8/10	Andrew Were Asst Chief	Chiga	Very impressed by the improved kitchen
13/11/10	Alice Kamunge	Vera beauty Collage	Very good technology keep up good work lets save our planet
8/4/11	Timothy Kennedy	0711615595	Learnt a lot and surprised so much

Include a sample(s) of any project communications or promotional materials developed (e.g., fact sheets, brochures, articles, flyers, presentation Materials, etc.) With respect to implementation of your project. For materials provided, please include a brief description of the product and how it was used.


SOLAR COOKERS INTERNATIONAL

Solar Cooker Review

Solar Cookers International welcomes AmyJo Mattheis as Executive Director

Improving women's finances with cleaner cooking technologies


SOLAR COOKERS INTERNATIONAL(EA)

SUNEWS

Promoting Health Through Clean Energy Technologies.

Ire! Moshi! Smoke! Omuosi! Eriokl Iyet!


KENDO MAR SOLA.


TED GI CHIENG


SOLAR COOKERS INTERNATIONAL (EA)

Visit us on www.solarcookers.org

Promoting Clean Cook stoves for Health and Wealth in East Africa

TESTIOMONIALS:

[redacted]

Ministry of Agriculture Kadibo Division.

My Ministry is the one charged with promoting energy saving stoves. Every year we would select one location and work there, but since 2009, when USEPA project came we have collaborated and have reached 8 locations almost at the same time. USEPA has greatly enhanced my work and made me surpass my targets as required in the performance contract. Awareness is high, people with skills for installation are all over and the stoves can be accessed easily. I am the happiest of all collaborators. The improved stoves have saved the trees since they use less wood and give the trees chance to grow. The work USEPA and SCI have done is commendable. You have made my work easier because when a farmer is in need of these interventions I just phone the SCOREP or installer of the area and the work is done.

[redacted] **(Village Savings Loans – VSL)**

A baby born must grow; if your kind does not grow then you have to be worried. There is a tendency we have found while working in a community, if you're a visitor in the community and they have received handouts and information about something, when you ask them about it they will pretend they have never received such information. They think by answering in the negative they will receive something. You were connected to USEPA, so where you have reached, continue to grow, open shops with the assistance from the VSL. Welcome to Muhoroni .

VI-AGROFORESTRY

I will not say much but thank you for your work in Kadibo. We know what we have done has helped us. There are those who produce and sell but have nothing for the family. I have also got assistance from John and Leah; I have the solar lamp which has saved me from buying paraffin every day. Even though the project is ending let's keep the contacts alive. Thank you for the good work and relationship we have had.

Ministry of Public Health and Sanitation

Thank you to USEPA, when I walk in the community their kitchens is clean. The fireless basket really brings peace, we place food in it and when the man of the house comes back he gets hot food. You people have helped us reduce stress and high blood pressure in homes. There are less incidences of coughs and colds. That means your work is having an impact so I urge you to continue.

9.5. Manufacturing and Sales Information

Complete the following table for each type/model of stove promoted in this project.

Month *(please add the month)*		TT YEAR ONE	TT YEAR TWO			Grand Total
# Stoves produced	*Stove Type*					
	UPESI	0	67			67
	UHAI	0	138			138
	FIRELESS	51	74			125
	SOLAR COOKIT	0	0			0
	LPG - GAS					
# Stoves sold	*Stove Type*					
	UPESI	187	927			1,114
	UHAI	12	61			73
	FIRELESS	52	33			85
	SOLAR COOKIT	349	233			582
	LPG GAS	3	1			4
Total production, distribution costs		2,630	980			3,610
Sales revenue		1,719	5646			7,365

Notes: Notes: The solar CooKits came already assembled and so the production cost was not accounted for within the project, same as LPG Gas and solar lamps.Most of the products, such as charcoal stoves were also sourced ready made as well as the *upesi* and fireless cookers hence there was negligible production in the area and concentration was more on marketing and sales. Revenues were reinvested into the project costs.

9.6. Stove Performance

Complete the following table with any stove testing/performance information you collected over the course of the project or provide a summary of the stove performance tests performed and their results.

Throughout the life of the project, several comparative stove performance tests were conducted in different dates for different reasons. Kitchen performance tests (KPT), Controlled cooking tests and even Water boiling tests (WBT)

- Tests comparing performance of 3 different types of solar cookers namely: Cookit, parabolic and pulsee cookers to boiled similar amounts of water or cook similar amounts of food.
- Comparing different types of wood stoves and measuring fuels before use (KPT), then measuring the wood left after food is cooked.
- Comparing performance of different types of fireless cookers, hole on the ground, basin, and basket containers to each other and the time taken to cook similar amounts of food.
- The results of the tests generated knowledge that was used by promoters to enhance sales of different types of interventions.

Below is one table that will demonstrate how the tests were recorded:

9. How are your stove(s) performing? *Please provide information on the type of laboratory and field testing you have performed to determine the effectiveness of your stove(s).*					
Type of Stove	**Test Performed** Kitchen Performance Test	**Date**	**Emissions**	**Fuel Use**	**Other Indicators Used**
Cookit	Baking cake took 2hrs	14/10/2009	None	Sun	
Uhai	Baking took 3.5 hrs,+ charcoal had to be bought, lit and the use of two pot when baking.	14/10/2009	As it was lit.	Charcoal	Burnt aroma of the cake
Upesi portable	Baking took 4 hrs,+ firewood had to be bought, lit and the use of two pot when baking. Had to be attended to and to maintain temperatures.	14/10/2009	Some	Firewood	Burnt aroma of cake

Type of stove	Test Performed Water Boiling Test	Date	Emissions	Fuel used	Other indicators
Cookit	Pasteurization of 3ltrs of water took 2hrs 50min	11/11/2009	None	Sun	WAPI melts at 65 Centigrade
Pulsee cooker	Boiling 3ltrs of water took 21mins.	11/11/2009	None	Sun	Bubbles
Parabolic	Boiling 3ltrs of water took 39mins.	11/11/2009	none	sun	Bubbles

9. How are your stove(s) performing? *Please provide information on the type of laboratory and field testing you have performed to determine the effectiveness of your stove(s).*

Type of Stove	Test Performed	Date	Emissions	Fuel Use	Other Indicators Used
Upesi	Kitchen Performance Test	30th June 2010		firewood	• Cooking of Ugali • Measure firewood 6kgs at 13hrs 18min. 6kgs • 13hrs 45min. Lighting the stoves • It took 15 min for the water to boil • It took 5 min for cooking the ugali • It took 0.8kg to cook the food (6kgs-5.2=0.8)
3 stones	Kitchen Performance Test	30th June 2010		firewood	• Cooking of Ugali • Measure firewood 6kgs at 13hrs 18min. 6kgs • 13hrs 45min. Lighting the stoves • It took 13 min for the water to boil • It took 6 min to cook the ugali • It took 1.5kg to cook the food(6kgs-4.5=1.5)

SOME IMAGES OF THE PROJECT

Demonstration at RIAT

The Pulsee Cooker

Testing cooked food

Site office in Kadibo

School Demonstration

Filming Cooked Food

Public Demonstration

Group Demonstration

Project Data

MONTH	TOTAL	QUARTER	apr-jun 09	jul-sep 09	oct-dec 09	jan-mar 10	apr-jun 10	jul-sep 10	oct-dec 10	jan mar 11	apr-jun 11	jul-sep 11	
AREA		*1*	2	3	**4**	*5*	**6**	**7**	**8**	**9**	10		**GT**
KADIBO COOKITS	427	*279*	5	8	17	2	49	42	16	9	-	-	**427**
ACCUMULATIVE		*279*	284	292	309	311	360	402	418	427	427		
OUTSIDE PROJECT AREA	164	*19*	4	2	15	10	10	5	76	13	1	9	**164**
ACCUMULATIVE	**229**	*19*	23	25	40	50	60	65	141	154	155		
RUNNING TOTAL		*298*	*307*	*317*	*349*	*361*	*420*	*467*	*559*	*581*	*582*		
KADIBO FIRELESS	50	-	14	6	17	1	2	2	2	2	2	2	**50**
ACCUMULATIVE		-	14	20	37	38	40	42	44	46	48		
OUTSIDE PROJECT AREA	30	-	4	4	4	1	2	5	6	1	-	3	**30**
ACCUMULATIVE		-	4	8	12	13	15	20	26	27	27		
RUNNING TOTAL		-	*18*	*28*	*49*	*51*	*55*	*62*	*70*	*73*	*75*		
Cookits	591	*298*	9	8	32	12	59	47	92	22	1	9	**589**
POTS & LIDS	672	*305*	11	58	43	12	63	47	94	22	6	11	**672**
WAPI'S	368	*298*	9	10	32	12	4	-	2	1	-	-	**368**
SCI BAGS	201	*20*	10	18	16	11	64	42	6	6	2	6	**201**
PLASTIC BAGS	3,904	*756*	108	310	386	144	708	568	636	168	12	108	**3,904**
BOOKS	626	*298*	15	10	34	12	59	74	92	22	1	9	**626**
fireless cookers	51	-	14	6	16	1	2	2	2	4	2	2	51

MONTH	TOTAL	QUARTER	apr-jun 09	jul-sep 09	oct-dec 09	jan-mar 10	apr-jun 10	jul-sep 10	oct-dec 10	jan mar 11	apr-jun 11	jul-sep 11	
in													
fireless cookers out	34	*4*	4	4	4	1	2	5	6	1	-	3	**34**
fireless cookers total	85	*4*	18	10	20	2	4	7	8	5	2	5	**85**
upesi liner BOUGHT	426	-	39	74	70	118	-	64	45	15	1	-	**426**
Upesi liner INSTALLED	-	-	-	-	-	-	-	-	-	-	-	-	-
upesi portable in	7	-	1	-	-	-	-	-	4	2	-	-	**7**
upesi portable out	4	*2*	-	1	-	-	-	-	-	1	-	-	**4**
upesi portable total	11	*2*	1	1	-	-	-	-	4	3	-	-	**11**
kcj	1	-	-	1	-	-	-	-	-	-	-	-	**1**
uhai jiko total	56	-	1	4	-	1	-	-	-	-	-	50	**56**
uhai jiko in	2	-	1	1	-	-	-	-	-	-	-	-	**2**
uhai jiko out	54	-	-	3	-	1	-	-	-	-	-	50	**54**
box cooker	8	*1*	-	-	-	-	5	-	1	-	-	1	**8**
gas	4	-	-	3	-	-	-	-	-	1	-	-	**4**
D-Light in	8	-	-	3	2	2	-	1	-	-	-	-	**8**
D-Light out	5	-	-	-	-	2	2	-	-	1	-	-	**5**
D-Light total	13	-	-	3	2	4	2	1	-	1	-	-	**13**
firefly	27								3	3	8	13	**27**
power pck jr	3								1	-	2	-	**3**
power													

MONTH	TOTAL	QUARTER	apr-jun 09	jul-sep 09	oct-dec 09	jan-mar 10	apr-jun 10	jul-sep 10	oct-dec 10	jan mar 11	apr-jun 11	jul-sep 11	
pck5watts	8										4	4	8
solar home system	1										1	-	1
moto poa gel in	5	-	-		3	2	-	-	-	-	-	-	5
moto poa gel out	7	-	-		4	-	-	-	1	-	-	2	7
moto poa gel total	12	-	-		7	2	-	-	1	-	-	2	12
moto poa stove in	2	-	-		1	1	-	-	-	-	-	-	2
moto poa stove out	2	-	-		1	-	-	-	-	-	-	1	2
moto poa stove total	3	-	-		2	1	-	-	-	-	-	1	4

-END OF REPORT -